ndustrial

Standardization

nd Commercial Standards Monthly

April 1943

In Two Parts—Part I

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Standardization

And Commercial Standards Monthly

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RUTH E. MASON, Editor

Our Front Cover: Standard Markings will help in use of grinding wheels (article page 109).
Photo courtesy Norton Company.

This Issue

ASA

Reg. in U.S. Pat. Off.

Standardization is dynamic, not static. It means not to stand still, but to move forward together.

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April, 1943 Vol. 14, No. 4

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National Safety

Good practice in construction, installation, inspection, testing, maintenance, and operation of cranes, derricks, and hoists is compiled in new American Safety Standard

Safety for Hoisting Equipment

by J. C. Wheat[1]

Chairman, ASA Sectional Committee on Safety Code for Cranes, Derricks, and Hoists

FOR many years the use of cranes, derricks, and hoists has been known as among the most hazardous industrial operations. Although comparatively few actual statistics are available on the frequency and severity of accidents due to faulty construction, maintenance, or use of hoisting apparatus, it is well known that when such accidents do happen they are likely to be particularly severe, and often fatal.

The need to reduce industrial hazards, and the corresponding need for a crane code, has been brought to an even sharper focus now that each hour of lost time means fewer tanks and guns, and less ammunition for the boys at the front. To help meet this need, a special effort has been made to finish the work of the ASA sectional committee which had been working on this large problem for some time. Due to this effort the compilation of standard good practice in construction, installation, inspection, testing, maintenance and operation of hoisting equipment has been completed. The result is the new American Standard Safety Code for Cranes, Derricks, and Hoists, approved by the American Standards Association in January.

Provides National Guide to Good Practice

Although the new standard cannot claim to provide the ideal in safety requirements for the protection of workers, it does give the first comprehensive outline of fundamental safety provisions for hoisting machinery on a national basis. Not only does it offer a guide to state and municipal authorities who have responsibility for supervising or enforcing industrial safety regulations, but it also serves as a technical document which can be of real help to manufacturers, and to users of hoisting equipment. It provides for the first time a nationally recognized code of good practice to which users can refer for help in determining important characteristics of the equipment they intend to buy. Perhaps even more important, the code will serve as a guide to methods of using such equipment to the best advantage. The sections on inspection, testing, and maintenance, which are expected to prevent use of equipment when not in proper service condition, will be of particular interest to all users.

Practically Every Plant Affected

Despite the fact that this standard is the first attempt at a compilation of national requirements for hoisting equipment and therefore has certain important omissions and possible weaknesses, it is one of the most important of the national safety codes because of the wide use of cranes, hoists, and derricks. Practically every plant in the country is affected by this standard, since even the smallest company usually has some form of hoisting apparatus.

The requirements of the standard apply to cranes and derricks driven by steam engines, electric motors, or internal-combustion engines as well as to their runways. It also applies to simple drum hoists of whatever motive power; to overhead electric hoists and their runways; to overhead air hoists; and to hand-powered derricks. It does not, however, apply to hoisting machines having a maximum capacity of less than one ton. Railway or automobile wrecking cranes, skip hoists, hand-operated chain hoists, and hoist-like units used only for horizontal pulling are not covered in the standard. In addition, such special equipment as mine hoists, conveyors, shovels, and drag-line excavators, and huge locomotive or crawler cranes having a capacity of 120,000 lb at 12-ft radius or equivalent moment, have been omitted. Likewise, the code does not apply to temporary use of cranes, derricks, and hoists on construction work. The regulation of transient construction cranes presents different

[1] Chief Crane Engineer, Industrial Brownhoist Corporation, Bay City, Michigan.

conditions from other industries and was, therefore, left to be covered by a general code for that industry. That code is now in the course of preparation.

This standard is, of course, supplemented by references to existing codes such as the Safety Code for Mechanical Power Transmission Apparatus (B15); the National Electrical Code (C1); the National Electrical Safety Code (C2); the Safety Code for Floor and Wall Openings, Railings, and Toeboards (A12); the Safety Code for the Construction, Care, and Use of Ladders (A14); and the Safety Code for Compressed-Air Machinery (B19).

Part I of the new standard provides construction details for each type of crane and hoist included. Mechanical guarding of moving parts and hoisting ropes, lubrication, brakes, hooks, and crane runways are covered. Requirements for construction of cages, electric equipment and also for footwalks and ladders are included for the types of cranes on which they are used.

Every outdoor overhead and gantry crane must be provided with secure fastenings to hold the crane against a wind pressure of 30 pounds per square foot, the severest storm below tornado or

National Safety Council

This unsafe practice of lifting a load at an angle is not permitted by the new safety standard

hurricane force. The fastenings must be convenient to apply.

Of particular interest in the provisions for locomotive, crawler, and motor-truck cranes are the sections on stability, both backward and when handling rated loads. Tipping or over-turning are hazards to which these cranes are particularly susceptible, and the amount and distribution of their weight is one of the most vital factors in preventing such accidents. An important contribution of the new standard is authoritative recognition of the present practice of the trade as to the amount and distribution of the counterweights required on the various sizes of these cranes to provide at least a definite minimum leeway against tipping when maximum loads are being handled and when the crane is swung around with no load and with boom pulled up to highest position.

Backward Stability Covered

The backward stability paragraph on motor-truck cranes is also of special interest since this type of crane is relatively new and up to this time counterweight limitations have not been standardized.

Part II covers Inspection, Testing, and Maintenance. Here, again, an important contribution is made, in a section which provides for retesting cranes or derricks periodically. At least every five years actual lifting tests must be made by a competent person and a written statement furnished specifying the safe working load. This safe working load is to be fixed at no more than 90 per cent of the maximum load sustained during the test. Test loads should be not more than 11.1 per cent in excess of the rated load, unless otherwise recommended by the manufacturer. Similar tests must also be made after an alteration to any part involving hoisting capacity or margin of stability.

First Basic Document

Due to the fact that the new standard represents the first basic document on the subject, certain important items could not be handled completely and satisfactorily in the light of the information now available. Such items, for example, as safe minimum or maximum sizes and other limiting dimensions of wire ropes and their fastenings, sheaves, drums, and similar equipment, have been omitted even though they are essential to safety in hoisting equipment operation. Although recognizing the importance of these subjects, the committee found that so many variable factors must be considered in each individual case that no fixed sizes, dimensions, or strength could be determined by the committee with any degree of unanimity. For example, safe sizes and strengths may depend on the acceleration or deceleration, or speed of the ropes, sheaves, or drums; on the type of attachments; on weather, or other at-

mospheric conditions tending toward corrosion or wear; and on many other factors. The committee recognized the advantage of large diameter drums and sheaves, ample factors of safety for wire ropes and all other parts of equipment, as well as avoidance of unsafe arrangements, but found it impracticable to cover them satisfactorily at this time.

Men Must Use Care

It was also found impracticable in the first issue of the standard to attempt to cover the very serious hazard on locomotive cranes of ground men getting caught between the carbody and the revolving superstructure. A variety of remedial measures are in use but varying conditions of service prevent general adoption of any proposed substitute for care and watchfulness on the part of the crane ground men.

The safe allowable loads and tensile specifications for chains have been limited to ASTM specifications for iron and steel chain (A56). A section on inspection of chains provides a correction table for the reduction of rated capacity of chains due to wear. It also provides for repairs, discusses the annealing of chains when in constant use, and limits the permissible stretch in the chains to assure that they shall be removed from service before they become worn to a dangerous point. Inspection and maintenance of wire ropes, and inspection and testing of chain slings and hooks and rings are included.

Provides Hand Signals

In addition to the mechanical requirements for keeping cranes and hoists in safe condition, there is the important factor of the human element in the operation of such equipment. As in so many other hazardous operations, safety in the use of hoisting equipment depends largely on the intelligence, care, and commonsense of the operator. It is, therefore, essential to have competent and careful operators, physically and mentally fit, thoroughly trained in the safe operation of the appliances and handling of the loads. The new standard outlines the qualifications that such an operator should possess, and also gives in detail some of the rules he should follow while on the job. It also establishes rules for handling the load.

As an aid in preventing misunderstanding during the operation of a crane, derrick, or hoist, standard signals are provided. One-hand signals, two-hand signals, and whistle signals are given. Whistle signals may be used only when a single crane is in operation, and a mechanical or electric gong is recommended in preference to a whistle. As an additional safeguard, a copy of the signals in use must be posted in a conspicuous place on or near the crane or derrick.

Each rule throughout the code carries a symbol adopted by the committee to indicate the relative

> The ASA sectional committee which developed the new American Standard Safety Code for Cranes, Derricks, and Hoists (B30.2-1943) worked under the administrative leadership of the American Society of Mechanical Engineers, and the Bureau of Yards and Docks of the United States Navy Department.
>
> Copies of the new standard can be obtained from the American Standards Association at $1.50 each.

urgency of its application. Certain provisions should be applied immediately to all installations; these are marked with the symbol AI. Other requirements should be applied only to new installations, and these are marked with the letters NI. Those provisions which need be applied only to the extent ordered by the administrative authority are marked AA. If a requirement is to be applied when the next renewal of parts is made, it is marked RI.

In order to expedite the completion of the first edition of the new standard, several chapters were numbered but the material for them has not yet been completed. These include Chapter 26 on inspection, testing and maintenance of overhead electric hoist and base-mounted electric hoists; Chapter 27 on inspection, testing, and maintenance of air hoists; and Chapter 32 on operation of jib and pillar cranes.

The committee has released the new standard recognizing that in addition to the chapters which have been specifically omitted, experience will probably bring to light additional material which should be included or changes which should be made. For this reason, the committee will welcome comments and suggestions for the improvement of the code which can be considered for future revisions. All such suggestions should be addressed to C. B. LePage, the American Society of Mechanical Engineers, 29 West 39th Street, New York.

> "As Americans we want to eliminate all possible confusions. We must utilize *all* our people, *all* our productive capacity, *all* our materials in top efficiency. In days like these there is little or no excuse for the specification of nonstandard materials. We must concentrate on standard materials through the use of standard specifications."
>
> **—American Society for Testing Materials *Bulletin*, January 1942.**

ASTM Issues Triennial Book of Standards

THE recently completed 1942 *Book of ASTM Standards,* issued in three parts, contains in their latest approved form all of the Society's widely used specifications and tests for materials, definitions, and recommended practices. The latest edition contains 1090 specifications and standard methods which cover more than 4900 pages.

Continuing the policy first used with the 1939 book, the latest edition gives all specifications, whether formal standards or tentative. The three parts cover:

Part I. Metals.—Ferrous and non-ferrous metals (all A and B and some E serial designations) except methods of chemical analysis. General testing methods (E serial designations).

Part II. Nonmetallic Materials—Constructional.—Cementitious materials, concrete and aggregates, masonry building units, ceramics, pipe and tile, thermal insulating materials (all C serial designations). Timber and timber preservatives, paints, varnishes and lacquers, road materials, waterproofing and roofing materials, soils (certain D serial designations). General testing methods, thermometers (E serial designations).

Part III. Nonmetallic Materials — General. — Fuels, petroleum products, electrical insulating materials, rubber, textiles, soaps and detergents, paper, plastics, water (remainder of D serial designations). General testing methods, thermometers (E serial designations).

Part I, Metals, is the most extensive part of the 1942 book, with 1690 pages and 361 specifications and tests. Of these, about 200 cover ferrous metals—steel, cast iron, etc. The balance apply to non-ferrous metals, copper, aluminum, and testing methods.

Part II, Nonmetallic Materials—Constructional, has more specifications and tests than any other, totaling 425. Many of these specifications are extensively used, including those on cement, brick, and building tile, concrete aggregates, etc.

The specifications and tests in Part III, Nonmetallic Materials—General, represent many of the newer phases of ASTM work—plastics, soaps and other detergents, paper and paper products, and the like. Almost as extensive as Part I, this book is distributed among a great variety of industries.

Supplements Will Be Issued

In addition to the *Book of Standards* the Society is also issuing a new edition of its volume of chemical analysis of metals, including 21 widely used standards for both ferrous and nonferrous metals. This book will be issued later in 1943. These methods are not included in the *Book of Standards.*

Each part of the 1942 Book has a complete subject index. The Part II Index, for example, covers 32 pages. There are two extensive tables of contents. The first lists all standards under general materials headings; the second lists them in order of the sequence of the serial designations. These features are intended to facilitate reference to any subjects covered. Some idea of the large increase in the books is indicated from the fact that the latest edition issued in 1939 contained 866 standards covering 3700 pages, whereas the present, 1942, edition contains 1090 standards covering 4900 pages.

To keep the books up to date in 1943 and 1944, a supplement will be issued to *each* part in *each* of these years. As a service with the 1942 *Book of Standards* there is a complete 200-page Index to Standards, which is furnished without additional charge and a copy accompanies the purchase of each part or complete set.

The cost of each part of the *Book of Standards* is $9.00; the charge for Supplements is $3.00 for each part, each year. For half-leather binding add $1.00 extra for each part and each Supplement part.

Copies of the ASTM *Book of Standards* may be obtained from the American Society for Testing Materials, 260 South Broad St., Philadelphia, Pa.

Women Ask OPA For Factual Labels

28 National Groups Seek to Link Price to Quality and Bar Hidden Increases

Price ceilings alone will not curb inflation, in the opinion of members of 28 national organizations who have joined in a plea for informative labels on clothing and other products. Leaders have collected 15,000 signatures on petitions stating their case to be presented to the Office of Price Administration.

The petitioners are asking the OPA "to require that goods bear informative labels clearly stating: What the article is; of what materials it is made and in what proportions; how it is made; what service may be expected of it, and how it should be cared for."

Each signer of the petition declares: "As a consumer I wish to aid the war effort by buying carefully. But just as soldiers need guns, so consumers need facts if they are to purchase wisely. I need facts which will enable me to tell whether a product is a good value for the price asked; how the product compares in quality with others of the same type, and whether the quality has been lowered with respect to the price ceiling."

Norton Company

Standardize Markings to Help in Use Of Grinding Wheels

by Harry B. Lindsay

Secretary-Treasurer,
Grinding Wheel Manufacturers Association

THE Department of State of the United States in an official release published January 7, 1938 included the following description of what the War Production Board currently terms "abrasive implements":

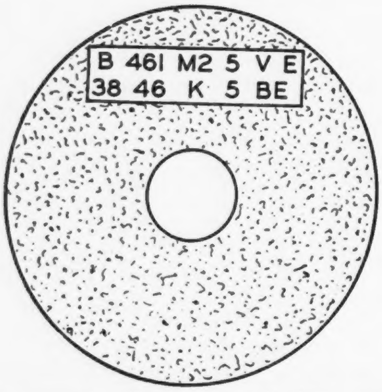
> "Emery wheels, emery files and manufactures, of which emery, corundum, garnet, or artificial abrasive is the component material of chief value, —."

These articles are usually described by the manufacturers and users as "grinding wheels, sticks, hones, files, stones, segments, blocks, and solid discs which are employed in grinding, sharpening, polishing and for the removal of stock, of metal, stone, wood, and other material."

Grinding Wheels and other bonded abrasive products are production tools, sometimes supplementing and sometimes inevitably replacing the single-point lathe or planer tool and conventional or special milling cutter.

Prior to 1885 polishing and grinding was done with grindstones and whetstones hewn from natural abrasive rock to shapes adapted for use. These abrasive tools were succeeded by the "emery wheel" formed by binding abrasive particles together with a vitreous mixture of fired potter's clays. In 1893 grinding wheels were first made of manufactured or "artificial" abrasive material (silicon carbide). By 1900 research had achieved the production of a second type of manufactured abrasive material in commercial quantities (aluminum oxide), and from that time abrasive products played a major part in the advancement of modern manufacturing practices.

Grinding wheels are indispensable tools in practically all industries, notably metal (including all steel, automotive and machinery production, guns, ships, tanks), lumber and wood, stone, glass, leather, and others. Almost every



Diagrammatic sketch of grinding wheel bearing dual marks. Top line, American Standard; bottom line, typical private marking. The following chart indicates what the symbols represent.

	Abrasive	Grain Size	Hardness or Grade	Structure	Bond or Process	Manufacturer's Records
G.M.	B	461	M2	5	V	E
Mfr.	38	46	K	5	BE	
Mfr.	AA	46	N	5	F	

article we use depends for its practicable quantity production upon the application of abrasives in some form, direct or indirect, in the process of manufacture.

Not so many years ago the grinding wheel was adequately described by a number, grain or grit size, and a letter designating hardness or grade. There are "old-timers" in every shop today who will attempt to grind anything to any required finish and "right to the mark" (plus or minus 0.001 in.) with a 46-L "emery wheel".

The 46-L might be a corundum wheel, an emery wheel, an aluminum oxide wheel or a silicon carbide wheel; and, given time and a good diamond truing tool, the "old-timer" can still make good his boast.

Specialized Grinding Wheels Needed

With the introduction of production lines and machine operators who know only one machine operation, there came the demand for specialized grinding wheels and hones, and coated abrasive products. It is not surprising that grinding wheel manufacturers adopted additional symbols to indicate abrasive, structure, bond, and combinations of grain sizes when the hourly and daily output of parallel production lines demanded exact timing of output of finished parts.

In a highly competitive industry it was also natural that these symbols should have variations from one another; but each set of symbols presented to the wheel manufacturer, *and to the user*, the possibility of duplication of grinding action. In that phrase, "duplication of grinding action", wheel after wheel, day after day, operator after operator, is the one and only end of grinding wheel markings, standard or no.

To each grinding wheel manufacturer, and to the user of wheels purchased from one wheel manufacturer only, there is perfect clarity in the symbol stamped in the lead bushing or imprinted on the blotter or wheel.

In large organizations where grinding wheels or other "abrasive implements" may be transferred from machine to machine, from department to department, or from Detroit to Toledo, it is important that grinding wheel marking symbols may be at least approximately recognized by all concerned.

Explanation of Standard Markings

This necessity gave rise to the prolonged study which has now culminated in the American Standard Markings for Grinding Wheels (B5.17-1943).

Under this standard, symbols are provided for:

1. Abrasive
2. Grain size
3. Hardness or grade
4. Structure
5. Bond or process
6. Manufacturer's record

Number one indicates eight variations of designated abrasives.

Number two indicates twenty-eight grain sizes, with suffixes indicating four possible combinations for each of the twenty-eight nominal grain sizes.

Number three indicates twenty-one variations of hardness or grade.

Number four indicates nine variations of structure (three of the nine being indicated as "preferred").

Number five indicates six variations of bonding process.

To the novice this suggests fearsome permutations and combinations equally as cryptic as the present maze of individual markings. To the initiate there is hope of ultimate clarity. Any man responsible for production from a manufacturing department must know the suitability and capacity of his tools.

The grinding wheel manufacturers hope and expect that the new American Standard will eventually help in the ordering of new wheels and the adaptation of those on hand to a new operation. There are, however, basic engineering reasons why no ready reference system will solve wheel choice, and no standard marking program can insure identical grinding action, which means uniform production. The reasons for this con-

clusion are obvious and derive from the demands of grinding wheel users for maximum production under particular circumstances involving machine design, material ground, dimension limits, finish required, and output per hour. Grinding action is influenced by all of the factors entering into the American Standard markings for grinding wheels. To consider only grade, it may be said that the grade of a grinding wheel aims to measure those characteristics of the bonding that affect the rate of wear of the wheel in use, so that this rate can be predicted from the grade measurement. Unfortunately there are many different characteristics of the bonding that are involved, and they are independent of each other. Among them may be mentioned the degree of adhesion to the abrasive grains, the tensile strength, compressive strength, modulus of elasticity, ductility or cold-flow, and the effect of temperature upon each of these characteristics.

Grinding Operations Affect Wheel Action

Furthermore, different grinding operations involve these independent variables to different degrees, and even in different ways. Thus it is perfectly possible to have one grinding wheel that acts softer than another on a certain grinding operation and harder on a different operation. Such action may be caused, for example, by differences in the heat developed in the two operations as compared with a difference in the cold vs hot bonding strength of the wheels; the wheel that is harder-acting when cold may have its bond more affected by heat and become softer-acting at the higher temperature.

Grinding wheel manufacturers welcome the establishment of an American Standard for marking wheels, but we believe that the general adoption of the new standard must be a gradual process acceptable to each individual wheel user in agreement with his suppliers. This process must be accompanied by admission on both sides that "tailor-made items" cannot always be cataloged into a universal symbolism, nor can grinding wheel manufacturers, hard pressed to supply the urgently needed tools of war production, find hands to edit and apply currently to their entire output the dual marking system which will be indispensible both to maker and user until the "old-timer" in the shop is as familiar with American Standard Marking B461 M2 5 VE as he once was with 46-L.

> The American Standard Markings for Grinding Wheels (B5.17-1943) was prepared by the Grinding Wheel Manufacturers Association and the Standardization Subcommittee of the General Motors Corporation. It was recommended for approval to the American Standards Association by the American Society of Mechanical Engineers, the National Machine Tool Builders' Association, and the Society of Automotive Engineers. These organizations are sponsors for the ASA project on Small Tools and Machine Tool Elements, under which this standard is included.
>
> The standard was completed in September, 1940, and was put into effect for a year's trial. As a result of the fact that it worked out satisfactorily during the year of trial, the ASA sectional committee, B5, recommended that it be accepted as an American Standard.
>
> Officers of committee B5 are: W. C. Mueller, American Society of Mechanical Engineers, *Chairman;* Frank O. Hoagland, National Machine Tool Builders' Association, *Vice-Chairman*; and P. L. Houser, member-at-large, *Secretary*.
>
> Copies of the standard are available from the American Standards Association at 25 cents each.

Communications Commission Standardizes Radio Terms

The terms used in discussing radio high frequencies have been standardized by the Federal Communications Commission in its public notice 66751, March 2. The terms "high frequency" and "ultra high frequency" have been used promiscuously for many years, and the new classification, it is expected, will serve to clarify usage throughout the industry.

The radio frequency bands and their designations are classified by the Federal Communications Commission as follows:

Frequency						Designation	Abbreviation
	10	to	30	kilocycles, incl		Very Low	VLF
Above	30	to	300	"	"	Low	LF
"	300	to	3,000	"	"	Medium	MF
"	3	to	30	megacycles, incl		High	HF
"	30	to	300	"	"	Very High	VHF
"	300	to	3,000	"	"	Ultra High	UHF
"	3,000	to	30,000	"	"	Super High	SHF

Westinghouse

One of the new Baldwin-Westinghouse freight locomotives in service on the New Haven Railroad which can be converted readily into high-speed passenger-service.

Improvements in materials, processes, new discoveries, and operating experiences have been recognized in new edition of standard for Railway Motors and Other Rotating Electrical Machinery on Rail Cars and Locomotives

by F. B. Powers[1]

Chairman, ASA Sectional Committee on Railway Motors and Other Rotating Electrical Machinery on Rail Cars and Locomotives (C35)

New Requirements For Railway Rotating Machinery

THE standard for railway motors and other rotating electrical machinery on rail cars and locomotives, originally published as tentative standard in March 1937, has been revised and brought up to date and has now been approved as American Standard by the American Standards Association. This action was taken on recommendation of the American Institute of Electrical Engineers, sponsor for the project. The American Standard is now being published for use by the railway industry, including both manufacturers and users of railway electrical machinery.

Commutation and Speed Tests

The new standard covers many more features than were included in the first AIEE standard on the same subject published in 1925.

The scope has been enlarged to include all "rotating electrical machinery forming a part of the power equipment of electrically propelled cars and locomotives."

In addition, other features covering commutation and overspeed tests have been included.

In order to give users of the standard a clearer understanding of the reason for the requirements, explanatory notes covering thermal capacity ratings, driving mechanism losses, and alternate methods of determining efficiencies have been added in the form of a preface and three appendices.

The 1925 AIEE rules for railway motors did not offer any requirements whatsoever in regard to commutation. It is recognized that there is no definite measuring stick for commutation at the present time which can be used to accept or reject the motors or generators on a stand test. It is also known that the machine must be provided with proper inherent commutation constants when it is designed and applied, if satisfactory commutation performance is to be realized in service. In many applications of modern, highly ventilated, and high-temperature railway motors and generators, however, the inherent commutation capacities of the machines become one of the real limits to their use. For that reason some rules covering this problem are included in the new standards.

In general, it may be stated that railway motors should be constructed with good running balance and have commutators well seasoned before being put in service. This is especially important with modern high-speed motors. It is practically impossible for any motor to commutate satisfac-

[1] Engineering Manager, Transportation and Generator Division, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

torily with the armature running out of balance or with a rough commutator.

Thermal Capacity

Thirty years ago, separately ventilated railway motors were practically non-existent. The earliest street-car motors were of the open type like ordinary industrial motors, but were soon followed by the fully enclosed type which were the rule for about fifteen years. Then motors with separate ventilation were introduced on heavy locomotives and were followed by the development of self-ventilated motors for street cars. Now the non-ventilated type are practically obsolete. This has made a great difference in the size and weight of the motors used.

Whereas the continuous rating current was 40 per cent of the one-hour rating for enclosed non-ventilated motors, the continuous rating of the self-ventilated motor is about 60 to 80 per cent, and for separately ventilated motors 80 to 100 per cent of the one-hour rating.

The current densities in the windings of the non-ventilated motors at the continuous ratings are so low that the windings have relatively large thermal capacity and can carry very heavy overloads based on the continuous current rating. The self-ventilated motor, however, usually has a much higher proportional current density at its continuous rating and correspondingly less thermal capacity and less overload capacity. The separately ventilated motor has still less relative thermal and overload capacity. The thermal capacity is usually the determining factor for the overloads the motor can carry.

The need for some measure of the thermal capacity of the motor has led to the retention of the one-hour rating for railway motors through a period when a greater and greater reliance has been placed on the continuous rating. There is no question that a good measure is needed for the continuous capacity of a motor in terms of current at different voltages, which corresponds closely to the rms current in service in the case of most motors. The thermal capacity, however, is also of great importance. For this reason the one-hour rating of railway motors has been continued in these rules as a connecting link between the old and new type motors and an additional rating has been added in an appendix. It is believed that this will afford a much better measure of the thermal capacity of ventilated machines than can be given in any other simple way and that it may eventually supersede the one-hour rating. This is called the thermal capacity rating.

The thermal capacity of a railway motor or a generator on an oil or gasoline-electric or a motor-generator type equipment is a measure of its overload capacity so far as the temperature of the windings is concerned. It is arbitrarily expressed in terms of the average number of seconds per degree required for the temperature of the machine to rise from an average running temperature to the maximum permissible temperature when operated at a definite overload. Preferably this overload should be high enough to limit the duration of the test to not more than 10 minutes.

The test given in the new standard is offered in the hope that it may prove to be a good measure of thermal capacity and will provide a test that is inexpensive to make which will assist in the comparison of generators of different origins. If it does this, it will be quite useful. Cooling curves are also recommended both with and without ventilation on separately ventilated machines.

The importance of the "Thermal Capacity Rating" is clearly demonstrated by the manner in which a high-speed electric passenger locomotive is frequently utilized in normal service.

The service capacity of a high-speed electric locomotive is dependent upon its short-time accelerating and thermal capacity as well as upon its continuous rating.

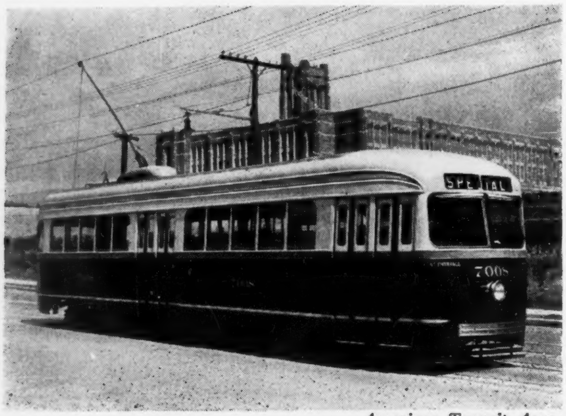
In order for a locomotive to haul its load at a speed of say 100 mph, it must first accelerate the train from some lower speed or from standstill to 100 mph, and it must do this quickly if any sustained periods of 100 mph operation are to be realized.

Most railroads have only certain limited stretches of roadbed on which maximum train speeds are permitted, and these sections of road are interspersed with stretches of track requiring lower operating speeds. As a result, the locomotive and train must be repeatedly accelerated and decelerated as the maximum speed sections are approached and left.

Road tests and calculations have demonstrated that only about 3,000 drawbar horsepower is needed to keep a 1,000-ton passenger train moving at 100 mph on level tangent track, whereas

This six twin, single phase, 25 cycle commutating pole, series motor weighs 16 lb per continuous hp as compared to the 82 lb motors built in 1907

Westinghouse


American Transit Assn

The new standard covers rotating electrical machinery for the motors used in modern streetcars such as these.

> The new American Standard for Rotating Electrical Machinery on Railway Locomotives and Rail Cars and Trolley, Gasoline-Electric and Oil-Electric Coaches (C35.1-1943) was prepared by an ASA sectional committee under the sponsorship of the American Institute of Electrical Engineers.
>
> Copies may be ordered from the American Standards Association at 50 cents each. ASA Members are entitled to 20 per cent discount on all approved American Standards purchased through the ASA office.

short-time accelerating capacities of 8,000 to 10,000 hp are needed for this same train in a great many applications. These high accelerating capacities are needed in order for the train to realize any appreciable periods of operation at the 100 mph speeds in the limited distances in which such speeds are permitted.

The necessity for bringing the railway motor standards up to date will be apparent when the developments of the last few years are fully considered. The motor designers have been very active and have produced remarkable results.

The problem has had and continues to have the most intensive study, and advantage has been taken of many improvements in materials, processes, new discoveries, and operating experiences. As a result there has been a gradual reduction in the dimensions and weight of the motor that is truly outstanding.

Throughout the entire electrical industry, railway equipment has always been the pioneer in setting the pace for getting more and more capacity into less and less space. This has been accomplished by using speeds and temperature limits far in excess of standards for other types of apparatus. Certain extremely radical developments are now taking place which may shortly permit the designer to set even higher limits to practical speeds and temperatures. In this case even greater strides may be taken in the design of railway rotating equipment.

War Committee Starts Work On Acme Screw Threads

The ASA War Committee on Acme Screw Threads for Aircraft, which was organized late last year, has now been enlarged at the request of the War Production Board, to include work on Acme threads for other special purposes as may be required by the Federal Services, such as the Army Ordnance Department.

As a result of the WPB request, the work on Acme screw threads is now being carried on under the contract between the War Production Board and the American Standards Association.

In line with its enlarged scope the title of the project has been changed to Acme Threads for Special Purposes, and the War Committee has been enlarged by the appointment of the following new members:

H. W. Bearce, National Bureau of Standards, Washington, D. C.

A. E. Smith, Army Ordnance Department, Senior Ordnance Engineer, Gage Section, Office of the Chief of Ordnance, War Department, Washington, D. C.

K. D. Williams, Bureau of Ships, U. S. Navy Department, Washington, D. C.

The other members formerly appointed on the committee are:

Professor Earle Buckingham, Massachusetts Institute of Technology, Cambridge, Mass., *Chairman.*

C. A. Reimschissel, Landis Machine Company, Waynesboro, Pa.

F. E. Richardson, Working Committee of the Aeronautical Board, Navy Department Building, Washington, D. C.

W. M. Smith, Bell Aircraft Corporation, Buffalo, N. Y.

The first meeting of the enlarged War Committee was held March 25.

Safety for Workers Studied At New York Safety Conference

MANY subjects of special interest in connection with the work of ASA committees on safety standards were discussed at the Fourteenth Annual Convention and Exposition of the Greater New York Safety Council March 23, 24, and 25. The conference, which had the advancement of the national war effort as its dominant theme, was the most successful and the best attended of any of the annual conventions held by the Council. More than 5,000 delegates were present at the various sessions.

Norton Company

Safety devices such as those shown here help keep the worker on the job

"Keep Working to Win"

The slogan of the program was "Keep Working to Win." Among the problems analyzed were industrial health and nutrition; getting workers to and from the job; war-plant accident and fire prevention; shipyard safety; meeting the transportation problem; keeping employees on the job; home safety; eye protection; occupational disease curbs; safe operation of buildings, and fundamental causes of accidents.

The results obtained and methods of using the American Safety Standards for compiling statistics on industrial injury rates and causes were presented at the session on fundamental causes of accidents. At the session on adaptation of women to war industries, safe clothing for women workers was discussed and a style parade demonstrated the type of clothing now available. Problems of procuring essential materials to keep elevators operating safely and problems of maintenance to keep elevators running for the duration were considered. Papers on control of dust, and health hazards in dusty operations as well as from toxic substances, bore closely on the ASA safety program on toxic dusts and gases.

"Identified as it is with the conservation of manpower for war work, safety has become a major problem of many ramifications," Frank L. Jones, president of the Greater New York Safety Council, declared. "Surveys show that industrial casualties are war casualties. Safety and efficiency here will help win over there. When we disable a worker in war time we may be disabling a soldier."

The American Standards Association is one of the 67 cooperating agencies working with the Greater New York Safety Council. Cyril Ainsworth, assistant secretary of the ASA, is vice-president of the Council.

Copies of papers presented at the convention can be obtained from the Greater New York Safety Council, 60 East 42nd Street, New York.

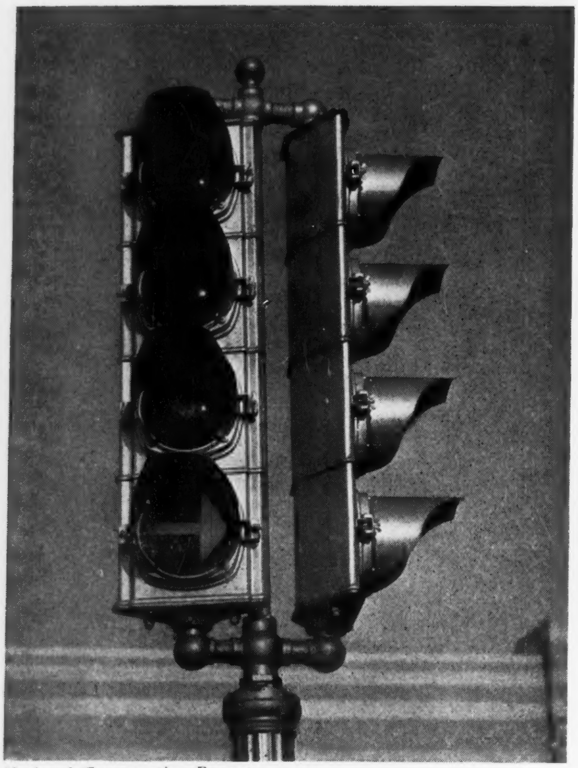
WPB Specifications Branch Reports on Steel for Mill Buildings

As a part of its activities, which are primarily pointed to the conservation of materials, the Specifications Branch of the Conservation Division of the War Production Board has issued a report entitled "Study of Amount of Steel Required for Steel Mill Buildings."

This report includes recommendations regarding modifications in design on both the walls and roofs of steel mill buildings and takes into consideration the War Production Board's National Emergency Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings (Directive 8) dated September 10, 1942.

Recommendations are included for widths of span and spacing of trusses. Estimates of the total amount of steel required for various methods of design, as well as various specifications for steel members are given.

Copies of the report together with sketches and charts are available from the Specifications Branch, Conservation Division, War Production Board, 1100 H Street, Washington, D. C.



National Conservation Bureau

Standards for Traffic Control Devices

by Donald M. McNeil

Former Chairman of the Standards and Specifications Subcommittee of the ITE and Traffic Engineer of Pittsburgh, Pennsylvania

THE Institute of Traffic Engineers has long felt the need for well written specifications covering all standard traffic control equipment. The Institute realized that such specifications must be generally functional in order not to impede research and development on the part of the manufacturers. At the same time, however, they should be sufficiently detailed and specific to insure well designed, well built material with enough sturdiness to stand up for years in 24-hour-a-day service and with sufficient flexibility to permit changes and additions as the needs of the city may require.

With this in mind the President of the Institute of Traffic Engineers, on instruction of the Board of Directors, some five years ago appointed a Standards and Specifications Subcommittee, consisting of some twenty members, to prepare the necessary specifications. The majority of the members of the committee were practicing traffic engineers who for many years had been writing specifications for their respective cities. The other members of the committee were engineers representing the various manufacturers. It was evident to those appointing the committee that specifications prepared by a single individual were frequently colored by the whims, likes, and dislikes of that individual, whereas specifications prepared by a group of practical men would be free from such individual preference.

The need for such a standard is apparent to all. First, the preparation of good specifications is a complicated and laborious task; and second, the writer of any specifications must keep in mind constantly the details of the apparatus to be purchased, so that all points may be adequately covered. The specifications must be so universal in scope and application that they may be used by all cities regardless of size. It is just as important to have good signals in small cities as in larger cities, especially since driving is made more uniform and therefore much easier throughout the country when the same specifications are universally used.

The committee realized the importance of its duty and, because of the magnitude of the task, wisely decided to break the job down into the various component parts of electric traffic signal equipment.

The first specification covering adjustable face traffic control signals was started five years ago and after three years of work on the part of the committee the finished specifications were published as Technical Report No. 1 of the Institute of Traffic Engineers.

More Efficient Optical System

The control of traffic by signals requires that positive information be conveyed to the motorist being controlled. As the traffic signal head is that medium used to convey this information to the public it was evident to the committee that its first duty was to develop standard specifications for a traffic signal head. This was im-

portant in view of the fact that there was then considerable variation in color value of the lenses and in the light transmission and distribution of the optical systems of the various manufacturers.

The physical requirements of the traffic signal head, exclusive of the optical systems, could be fairly readily agreed upon. However, due to this existing variation in the optical systems of the various manufacturers, considerable research and many tests were necessary before any agreement could be reached. Each manufacturer was requested to make available to the committee one or more of his complete optical systems and also a red, a yellow, a green, and a clear lens.

The red, the yellow, and the green lenses of each of the manufacturers were tested to obtain the chromaticity of color and transmission value. Candlepower charts, showing light distribution, were made of each manufacturer's optical system, using the clear lens which was furnished. The committee then, by interchanging lenses and reflectors of the various manufacturers, made other candlepower distribution charts.

It was evident after these tests that a materially improved optical system, considerably more efficient than any other on the market at that time, was possible. Representatives of the committee discussed this matter with the large reflector and glass manufacturers and were assured that such an optical system was practical and could be obtained at a nominal cost.

Day and Night Tests Made

During the annual meeting of the Institute of Traffic Engineers at Atlantic City in 1939 and in Chicago in 1940, the committee made many daylight and night tests of the color of the lenses submitted by the manufacturers, and formulated specifications. After the committee had assurance from the glass manufacturers of their ability readily to produce these approved color lenses, these specifications were formally recommended to the Institute of Traffic Engineers. On receipt of this recommendation of the Standards and Specifications Subcommittee the ITE formally adopted these specifications.

In order then to make the specifications national in scope the Institute of Traffic Engineers submitted them to the American Standards Association for approval as an American Standard. In considering the specifications the American Standards Association submitted them to interested associations for consideration and approval before final adoption. They were submitted to the Traffic Signalling Group of the National Electrical Manufacturers Association, and also to the International Association of Municipal Electricians. After consideration of the specifications, both these associations gave approval. The Institute of Traffic Engineers' specification on adjustable face traffic control signal heads was accordingly approved by the American Standards Association as an American Standard.

The first standard developed by the Standards Subcommittee of the Institute of Traffic Engineers and approved by the American Standards Association was the American Standard for adjustable-face signal heads. In this article, Donald M. McNeil, former chairman of the subcommittee, describes the development of this standard and the research which led to agreement on standard colors for lenses of traffic lights.

The subcommittee now has completed new standards for all types of traffic signal controllers. After approval by the Institute of Traffic Engineers these new standards will also be submitted to the American Standards Association.

Thus, for the first time, a national standard is available for traffic signal heads. The best colors for traffic signal lenses are standardized; and municipal purchasers are assured of a greatly improved optical system of considerably more candlepower light output and good light distribution for control of all types of traffic. In addition, the specifications require a strong, durable, weather-tight, and corrosion-resisting housing of sectional construction, so that additional sections may be added when necessary.

Since the completion of these specifications, the committee has prepared standard specifications for "arrow" lenses for use in directing traffic moving in certain directions during a specific interval, and for "walk" lenses for use as a pedestrian indication. The Standards and Specifications Subcommittee of the Institute of Traffic Engineers, under the direction of William C. Brandes, the chairman, has also prepared standard specifications covering all types of traffic signal controllers from the simplest to the most complicated type, including the following:

1 Synchronous non-interconnected controllers
2 Synchronous future-interconnected controllers
3 Synchronous interconnected controllers without remote cycle change
4 Synchronous interconnected controllers with remote cycle change
5 Induction non-interconnected controllers
6 Induction interconnected controllers with remote cycle change
7 Synchronous master controllers used with Controllers 4 and 6 above
8 Induction master controller for use with Controller 6 above

These specifications will be submitted soon by the Institute of Traffic Engineers to the American Standards Association for adoption as an American Standard. After the American Standards Association approves the specifications they will be published in pamphlet form by the Institute of Traffic Engineers and offered to all cities or persons who may desire to use them.

Signal Corps Organizes Standards Agency

Cooperates Closely With ASA War Committee on Radio

ALL standardization activities under the control of the Chief Signal Officer have been placed in charge of a Signal Corps Standards Agency, with headquarters at Red Bank, New Jersey, in close proximity to the Fort Monmouth Signal Laboratory of the Signal Corps Ground Signal Service. Officer and engineering personnel representing each laboratory of the Signal Corps in which a standardization group has been set up are to be stationed at this headquarters. The Agency has the officer, technical, and clerical personnel required to carry out its functions.

The Standards Agency has responsibility for determining policy concerning standardization of resistors, capacitors, tubes, and other components of Signal Corps equipment. It also has responsibility for coordinating with the Navy on policy in connection with standardization. To carry out this function, a representative from the U.S. Navy Department, Bureau of Ships, is permanently stationed at headquarters of the Agency at Red Bank.

In order to carry forward the work of the ASA War Committee on Radio as rapidly as possible, Colonel G. C. Irwin, Officer in Charge, has made available to the Committee important technical facilities and personnel. The members of the ASA staff engaged in the activities of the War Committee on Radio work closely with the Agency. To assist in this cooperation a Branch Office of the ASA has been set up in Red Bank in space provided by the Agency. It should be pointed out that neither the Signal Corps Standards Agency, the War Production Board, nor the American Standards Association have any other idea in setting up these arrangements than to expedite the program for development of standards for military radio in the interest of the war effort. The arrangements will in no way affect the procedure of the American Standards Association under which this standardization program is being conducted. All concerned can be sure that nothing will be done which will in any way interfere with the inherent right of all to participate fully and on an equal basis with one another. This essential feature of ASA procedure has demonstrated its effectiveness in producing standards which are technically sound, practically useful, and nationally acceptable.

Cotton Textile Manufacture Simplified

In order to increase production the War Production Board, through Order L99, has ordered the cotton-textile industry to simplify constructions of a specified list of fabrics. Through this simplification it is expected that about 230,000,000 additional yards of cotton textiles will be produced annually.

The order, as amended, now covers standard print-cloth construction and Class C sheetings, as well as Osnaburgs and Class A and B sheetings which were previously covered. As provided by the order, specified looms may weave only fabrics which are listed.

War Standard Ratings for Steel Pipe Flanges and Fittings

by N. O. Smith-Petersen[1]

Chairman, ASA War Committee on Rating of Pipe Flanges and Fittings

HIGHER pressures have been authorized for steel flanges, flanged fittings, and valves used in water, steam, and oil pipe lines in an American War Standard approved recently by the American Standards Association. The new War Standard pressure-temperature ratings are revisions of Tables 6 through 11 of the American Standard for Steel Pipe Flanges and Flanged Fittings (B16e-1939), and are expected to increase economy in the use of steel for pipe lines, thus helping in the country's steel conservation program. The new standard gives detailed information concerning calculation results and materials, and also contains four tables of pressure-temperature ratings with charts.

Changes Keep Standard Up-to-Date

Standard pressure ratings for steel flanges and fittings have been in existence since 1927, in which year the American Engineering Standards Committee (now the American Standards Association) published its tentative American Standard B16e, Steel Pipe Flanges and Flanged Fittings. This standard has been revised several times and extended to meet the needs of the industry, revisions having been published in 1930 and 1939. The 1943 War Standard is a further effort toward keeping the standard abreast of industrial progress and engineering development.

Although completion of the new War Standard was speeded due to the war needs, an investigation of the ratings in the original standard had been started as early as 1941. The task of revising the 1939 standard had been delegated originally to a special subgroup of the ASA Sectional Committee on Standardization of Pipe Flanges and Flanged Fittings (B16). This subgroup represented Subcommittee 3 on Steel Flanges and Fittings and Subcommittee 4 on Materials and Stresses of the sectional committee. In August, 1942, in order to carry forward the work as rapidly as possible this subgroup was organized as an ASA War Standards Committee at the suggestion of the War Production Board.

Since the subgroup had begun its work previous to our country's entry into the war, it had already developed a comprehensive plan for determining the strength of flanges as well as a plan to extend the pressure-temperature ratings to a greater number of flange materials. From the preliminary work on these plans it was apparent that the pressure-temperature ratings could be increased. These plans called for extensive engineering work, however, which was not yet completed when war conditions brought the need for conservation of essential war materials. The war requirements for steel appeared to exceed our steel-producing capacity, and economy in the use of steel became a national demand. Higher pressure-temperature ratings for steel flanges, valves, and fittings would further this economy in the use of steel, and therefore the special subgroup, now the ASA War Committee, took steps to hasten the completion of its rating revision.

As a result, the comprehensive plan was discarded and an abbreviated plan for the strength analysis of the flanges was adopted. Thereby, instead of approximately 2400 flange calculations, only approximately 450 flange calculations were required. This reduction in the amount of work was accomplished by introducing the use of "probing" calculations in place of complete calculations.

The probing calculations consisted of the calculation of the flange strength for the 900 psi

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A more detailed article by Mr. Smith-Petersen about the new War Standard Pressure Temperature Ratings is being published in the April issue of *Heating, Piping, and Air Conditioning*, 6 North Michigan Avenue, Chicago, Illinois. In this article, drawings showing flange stress formulas and diagrams of the location of flange loads are included, with formulas for their amounts and moments, for all the different facings and flange types.

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[1] Walworth Company, New York.

pressure series for all the different flange types, flange facings, and flange sizes. In addition, another set of probing calculations was made consisting of the calculation of the flange strength for one flange size for all pressure series.

Calculations of the flange strength of the 900 psi pressure series disclosed the effect of flange facings upon the strength of the flange as well as the difference in strength of the various flange types. These calculations also gave information concerning the difference in strength between small and large flanges. Calculations of one flange size for all pressure series disclosed the strength interrelation between pressure series. Having obtained this information about the strength of flanges in general, the unprobed, or not calculated, flanges were assumed to follow the same strength pattern. Upon this basis of calculation the revised pressure-temperature ratings were determined.

Members' Companies Made Calculations

To accomplish the work of making approximately 450 flange strength calculations, each member of the special subgroup arranged with the engineering department of the company he represented to undertake a certain portion of it. For this purpose there were then prepared a special formula sheet and printed forms for calculation procedure in order to facilitate calculations and insure correct results.

For the flange strength calculations the Waters' and associates' flange formula was used. This is the only flange formula which permits calculation of stresses in three axial directions, and the formula has been approved by the ASME Boiler Code Committee.

For use in connection with flange strength calculations the ASME Boiler Construction Code gives valuable gasket data. From these data a "gasket factor" of 5.5 was selected for the flange calculations. In addition to the flange loading prescribed by the ASME Boiler Construction Code a pipe line expansion force was included. This force was taken as equivalent to a flange bolt stress of 2000 psi.

American Chain and Cable Company

Steel Flanges and Tees

Different Stress Results for Different Pressure Series

The calculations gave different stress results for the different pressure series, flange sizes, and flange types. If the stress results are used to indicate the order of strength for the pressure series, this order will be as follows: 300 psi, 2500 psi, 600 psi, 1500 psi, 400 psi, and 900 psi. For flange sizes the relative order of strength is: the small sizes first, the larger sizes next, and then the intermediate sizes. For flange types the integral flange is the strongest, the blind flange the least strong.

The stress results were separated in two groups, those for ring joint facing, and those for other-than-ring-joint facing, and an average or compromise stress was determined for each group. This stress was then used to find the primary service temperature for the group from allowable stress-temperature curves by accepting as a primary service temperature the nearest fifty-degree temperature multiple below the actual temperatur obtained by the stress. By taking the nearest fifty-degree temperature multiple below that actually determined, considerable conservatism in pressure rating was introduced, for the stress-temperature curve near the primary service temperature varies rapidly with the temperature. The primary service temperature was determined for two materials only, the same materials as are rated in the B16e-1939 standard, namely, carbon steel and carbon molybdenum steel. Both these steels are given the same rating for forgings and castings, just as in the 1939 standard, basing the rating upon the strength of the cast material.

Change in Pressure Rating Curves

The next step in the pressure rating of the flanges was to determine upon pressure ratings above and below primary service temperature. The procedure here followed was to make the pressure rating curves approach the allowable stress-temperature curves more closely than do the 1939 pressure rating curves. The B16e-1939 pressure-temperature rating is practically a straight line from the primary service temperature to room temperature. The allowable stress-temperature curve, however, is a curve with a decided vertical convex terminating in a maximum point at 650F, from which point it runs horizontal to room temperature. There is, therefore, quite an area useful for rating purposes between the B16e-1939 pressure-temperature rating straight line and the allowable stress-tempera-

ture curve. It is within this area that the new pressure-temperature rating curve lies. Both the 1939 and the 1943 pressure rating curves for carbon steel and carbon molybdenum steel are shown on charts in the new War Standard.

Lap-on-Welding Flanges Have Same Ratings

To meet demands received in the past for a dimensional standard as well as pressure-temperature ratings of slip-on-welding flanges for series above 300 psi such flanges will be permitted the same pressure-temperature ratings as screwed or lapped flanges. These flanges must be made of a material suitable for fusion welding (excluding flanges made of material meeting requirements for B and B2 material of ASTM Specification A27-39).

A draft of the new War Standard was distributed to an extensive list of individuals having special technical competence in this field. Some of the suggestions received led to slight revisions of the draft, but in general the replies indicated the approval of those canvassed. Other suggestions have been held over for further consideration after the war emergency has passed.

The standard was approved by the American Standards Association as an American War Standard on January 26, 1943.

The Asa War Standards Committee which prepared the new standard Pressure-Temperature Ratings for Steel Pipe Flanges, Flanged Fittings, and Valves (B16e5-1943) has the following membership:

N. O. Smith-Petersen, Walworth Company, *Chairman*
L. D. Burritt, Standard Oil Development Company
Sabin Crocker, Detroit Edison Company
James P. Ferguson, Reading-Pratt and Cady Division, American Chain and Cable Company
V. T. Malcolm, Chapman Valve Manufacturing Company
E. C. Petrie, Crane Company
D. B. Rossheim, M. W. Kellogg Company
J. R. Tanner, Tanner and Arnold

Copies of the American War Standard are available from the American Standards Association at 25 cents each. Copies of the American Standard for Steel Pipe Flanges and Flanged Fittings (B16e-1939) and the War Standard revision (B16e5-1943) may be obtained from the American Standards Association at $1.50 for both documents.

"War Model" Is Standard Term For Products Based on WPB Orders

The standard term "war model" has been decided upon by Government war agencies to indicate commodities which meet the requirements of specifications designed to provide greatest wartime serviceability with the least drain upon manpower, critical materials, and plant and transportation facilities.

Terms formerly used have included "victory model," "utility model," "simplified model," and "war model." These terms have all been used more or less interchangeably, which has resulted in some confusion, especially since the terms "victory model," and "utility model" have been extensively appropriated by private firms to indicate brands of those firms, the Office of War Information declared February 23.

The use of the term "war model" will be reserved to describe commodities which meet the requirements of specifications designated as "war models" in production and price regulations issued by government war agencies, the OWI announced.

The change has the backing of the Inter-Departmental Advisory Committee to OPA's Standards Division, of which Dr. Faith Williams, chief, Cost-of-Living Division, Department of Labor, is chairman. The membership of the committee includes representatives of all Federal agencies concerned with problems of standardization.

No More American Recommended Practices

Standards will no longer be approved by the American Standards Association as American Recommended Practice, the ASA Standards Council decided last month. This action eliminated paragraph (b) of Section 103 of the ASA Procedure (PR 34d), thus providing that from now on all standards approved by the ASA will be "American Standards."

The Council voted that "Standards that are approved by the Association shall be called 'American Standards,' for example: American Standard (Specifications, Definitions, Practice, Code, Method of Test, Abbreviations, Operating Rules, Procedure, or the like)."

Australia Starts Campaign for Use of Statistical Control of Quality

Standards Association of Australia Adopts American War Standards to Help Engineers Solve Production Problems

"THE year 1943 opens with the launching of an active campaign to introduce the statistical method of quality control into Australian industry," announces the January, 1943 issue of the *SAA Bulletin*, published by the Standards Association of Australia. The *Bulletin* has just been received by the ASA.

"Whilst the initial objective is increased effectiveness in the war effort, it should be clearly understood that the introduction of the new technique is not an emergency measure only," the *Bulletin* declares. "Undoubtedly it has come to stay, as an integral feature of modern manufacturing production. . . . That prevention is better than cure is as true in industry as in medical practice. With the adoption of the control chart method, the inspecting engineer will come to be judged, not by the amount of material he scraps, but by the amount of help he gives the production engineer in maintaining rejections at a low level."

The Standards Association of Australia has endorsed as Australian Standards the three American War Standards on Quality Control: Guide for Quality Control (ZI.1-1941); Control Chart Method of Analyzing Data (Z1.2-1941); and Control Chart Method of Controlling Quality During Production (Z1.3-1942).

Committees are now being set up in New South Wales and Victoria to organize means of giving information and guidance to Australian industry in the adoption and use of statistical methods of quality control. These committees will provide advisory bodies to which inquiries and problems may be referred. They will also have responsibility for providing facilities for training engineers in the details of quality control.

War-Time Packing Specified For Overseas Shipments

Specifications which prescribe the proper methods of packing war materials for overseas shipments have been made available by the Container Coordinating Committee, War Production Board. The specifications are designed to insure proper delivery of war materials in usable condition, with the most efficient utilization of containers and of transportation and distribution facilities.

The specifications have been issued in a booklet, "Army-Navy General Specifications for Packaging and Packing for Overseas Shipments", released by the Division for distribution to manufacturers and shippers engaged in the war program. It is for use by the armed forces, war agencies, and contractors.

All shipments of war materials and supplies, whether scheduled for immediate shipment overseas, or for delivery to storage and subsequent shipment overseas, must comply with the requirements and instructions given in the booklet.

The booklet was prepared by the Container Coordinating Committee, WPB, with the cooperation and approval of the Army, Navy, Department of Agriculture, Treasury Department, WPB, Office of Lend-Lease Administration, War Shipping Administration, and Office of Defense Transportation.

The committee was formed within the Containers Division, WPB, in July, 1942, to guard against waste of shipping space in American ships taking war materials and supplies overseas.

Albert Luhrs, chairman of the committee, said that the booklet marks the first time such specifications for overseas shipment have been prepared. He said that the specifications are designed to satisfy the requirements imposed by unusually severe conditions encountered in overseas shipment during wartime.

Special care has been taken to provide adequate protection against corrosion of machine parts, and against moisture so that machine parts, assemblies, delicate instruments, etc., may be in a satisfactory operating condition as soon as they are unpacked.

Copies may be obtained at the Containers Division or at any of the cooperating agencies.

Refined Quality Control Speeds Up Production

Control Chart Helps Spot Process Trouble, Saves Inspection Cost

by John Gaillard

Mechanical Engineer,
American Standards Association

Part I

MANY manufacturing plants engaged in war production complain that their work results in an excessive proportion of nonacceptable product or, in other words, too large a "per cent defective." This may be due to any one of a number of causes. It may be that the work is different from anything the plant has done before, or that the manufacturing tolerances specified by the government are closer than those to which the plant is accustomed.

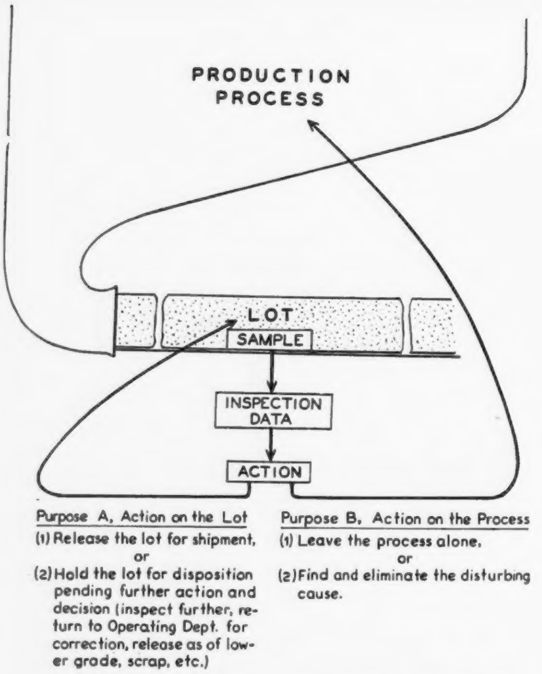
So long as trouble of this kind persists, the manufacturer will say that he has not yet got "control" of the quality of his product.

Such a condition calls for action. Although some of the defective product may be salvageable, there is still loss of material, labor, machine capacity, and—a highly important factor just now —loss of *time*.

What Is Control?—Ideally, control of quality of a manufactured product would mean that every unit of that product meets its specified requirements. Thus, perfect dimensional control of machine parts would be achieved if the sizes of all parts manufactured fell within their gage limits. In practice, no such absolute perfection exists. The per cent defective may be cut down to a very low figure, but we can never reasonably expect to get no rejections whatsoever. So far, when the manufacturer has said that he had attained control of quality, he usually has meant that he had succeeded in keeping the per cent defective down to a level satisfactory to him—a matter of personal judgment. If at first the per cent defective was 4, and he had gradually brought it down to 0.5, he might hold that he had attained control, even though by further efforts he could have reduced the per cent defective still more, say, to 0.03.

This vagueness of the "traditional" concept of control has several practical disadvantages, some of which are quite important. For example, if the manufacturer, in spite of efforts to reduce the per cent defective to an acceptable figure, has failed to do so, he may ask himself whether he should keep on trying or give up the matter as impossible. If the kind of work is entirely new to him, he may easily take the wrong decision and either give up, although with further effort the problem could be solved or, conversely, persist where success is out of the question. Therefore, the "traditional" concept of control does not give the manufacturer a definite answer to practical questions like these: Can the per cent defective be reduced by adjusting the production process in use, or must this process undergo basic changes before improvement may reasonably be expected? What is the highest degree of accuracy attainable with a certain production set-up—that is, with given materials, tools, machines, operators, and methods of manufacturing and inspection? Is it practical, in a specific case, to shift from selective fitting to assembly of interchangeable parts, or are the closer manufacturing limits required in the latter case prohibitive?

Quality Control Standards—The manufacturer will get an answer to such questions by applying a technique described in a set of three American War Standards on Quality Control. Here, the concept "control" is given a definite meaning and the manufacturer is supplied with a criterion for detecting lack of control. Also, where such lack is indicated, he knows that he must look for trouble in the production process so that he may find its cause with the least possible delay and eliminate it, if practicable. However, if there is no indication



The quality control chart described in this article may be used for two main purposes, as illustrated in the above diagram. One purpose (A) is to judge the quality of a lot of product—without considering the way it was made, as the manufacturer is often obliged to do in regard to purchased products. The other, most important, purpose (B) of using a quality control chart is to decide whether there is an indication of trouble in the production process which calls for removal if quality is to be controlled.

of lack of control, the manufacturer may safely assume—as wide practical experience has shown—that he is doing the best he can, with the process in use. Therefore, if this "best" is not good enough to meet the requirements of the product—specified, for example, in terms of manufacturing limits—he knows that he will be able to get product of the right quality only by making basic changes in the process, and not by merely adjusting it.

Origin of Standards—Upon request by the War Department, the American Standards Association (ASA) started in 1940 a project on the Application of Statistical Methods to the Quality Control of Materials and Manufactured Products. Three American War Standards, completed by an ASA committee[1], have so far been published. They are: Guide for Quality Control (Z1.1-1941); Control Chart Method of Analyzing Data (Z1.2-1941); and Control Chart Method of Controlling Quality During Production (Z1.3-1942).[2]

What Is Quality?—Before we can discuss *control* of quality, we must have a clear picture of what we understand by *quality*. Roughly, the quality of a product may be defined as its suitability for a given purpose. Hence, to be able to judge or measure quality, we must begin by specifying the requirements we want the product to meet, or in other words, the *quality characteristics* we want the product to possess. Such a characteristic may be dimensional accuracy specified in terms of the manufacturing limits within which certain dimensions of a workpiece must be held if it is to be accepted by the inspector. Other specified quality characteristics may be the tensile strength and the elongation of the steel of which the piece is made.

Specification of quality is most definite if the characteristics involved are stated in terms of measurement. If this is impossible, we may at least be able to establish a sample or model to serve as a basis of comparison for the product to be made. An example is the finishing of a workpiece to a "surface quality" represented by a sample block or disk.

Collective Quality—So far, we have discussed the concept "quality" as relating to a *unit* of product—that is, to an individual piece, subassembly, or complete article for which quality requirements have been specified. However, when we think of *control* of quality, we do not have in mind whether a given unit of product meets its requirements but, rather, whether or not the totality of the product, as it comes in lots or in a continuous flow from the line, is satisfactory in the sense that it contains a sufficient percentage of acceptable units. In other words, the product is considered here as a collection of units and the term "quality control" accordingly refers to the *collective quality* of the product. If all of the pieces in a lot of 1,000 are inspected and eight pieces are rejected, we can express the collective quality of this lot by saying that its per cent defective is 0.8.

How small should be the per cent defective in a specific case to justify our claiming that we have got control of quality? Is there any criterion that will aid us in answering this question?

Level and Dispersion of Quality—Before we go more deeply into this question, let us consider the concept "collective quality." Suppose we look at ten lots of 1,000 pieces each, and determine the per cent defective of each lot by gaging all of its units. The collective quality of these

[1] Membership: H. F. Dodge, Bell Telephone Laboratories, *chairman;* A. G. Ashcroft, Alexander Smith and Sons Carpet Co; W. Edwards Deming, Bureau of the Census; Leslie E. Simon, Army Ordnance Dept; R. E. Wareham, General Electric Co; and John Gaillard, ASA, *secretary.*

[2] The first two standards were published in a single pamphlet in 1941 and the third standard was published in July, 1942. Copies are available from the ASA, 29 West 39 St., New York.

ten lots, considered together, may then be measured by the arithmetic mean or *average* of the individual percentages of the ten lots. This average represents their common *level of quality* which we would have found also by combining the ten lots into a large one of 10,000 pieces and determining the latter's per cent defective. However, when we have ten separate lots of 1,000 pieces, we come upon another aspect of their collective quality. This is the extent to which the qualities of the 1,000-piece lots deviate from their common quality level (average per cent defective). If their qualities all are rather close to this common level, this is an indication that the overall quality of the product has a high degree of uniformity. If, on the contrary, the qualities of the 1,000-piece lots are spread out or dispersed more widely, the overall quality appears to be less uniform. Therefore, the *dispersion* of individual qualities or group qualities about their common level of quality is a second important characteristic of collective quality. It gives a picture of the degree of uniformity of quality in the total volume of product under consideration.

Measurement of Collective Quality—To *measure* collective quality, we must have units of measurement for the *level* and the *dispersion*. We have already seen that the level can be simply expressed by the *average* of the measurements (observations) of a given quality characteristic. If a quality characteristic X, such as the size of a workpiece or the tensile strength of a specimen of material, is measured on each of a number of units n, and the observations are: $X_1, X_2, \ldots X_n$, their average $\bar{X}$ (pronounced "X bar") is expressed by the formula:

$$\bar{X} = \frac{X_1 + X_2 + \ldots\ldots + X_n}{n}$$

To express the *dispersion*, we can use several kinds of measures. One of those commonly used in problems of this kind is the *standard deviation* (root-mean-square deviation) of the observations from their average. It is customary to designate the standard deviation by the Greek letter σ (sigma). In the example just mentioned, the standard deviation of the n observations from their average $\bar{X}$ is expressed by the formula:

$$\sigma = \sqrt{\frac{(X_1 - \bar{X})^2 + (X_2 - \bar{X})^2 + \ldots + (X_n - \bar{X})^2}{n}}$$

Another measure of dispersion frequently used here is the *range (R)*. This is the difference between the highest value and the lowest value among a set of observations, or

$$R = X_{max} - X_{min}$$

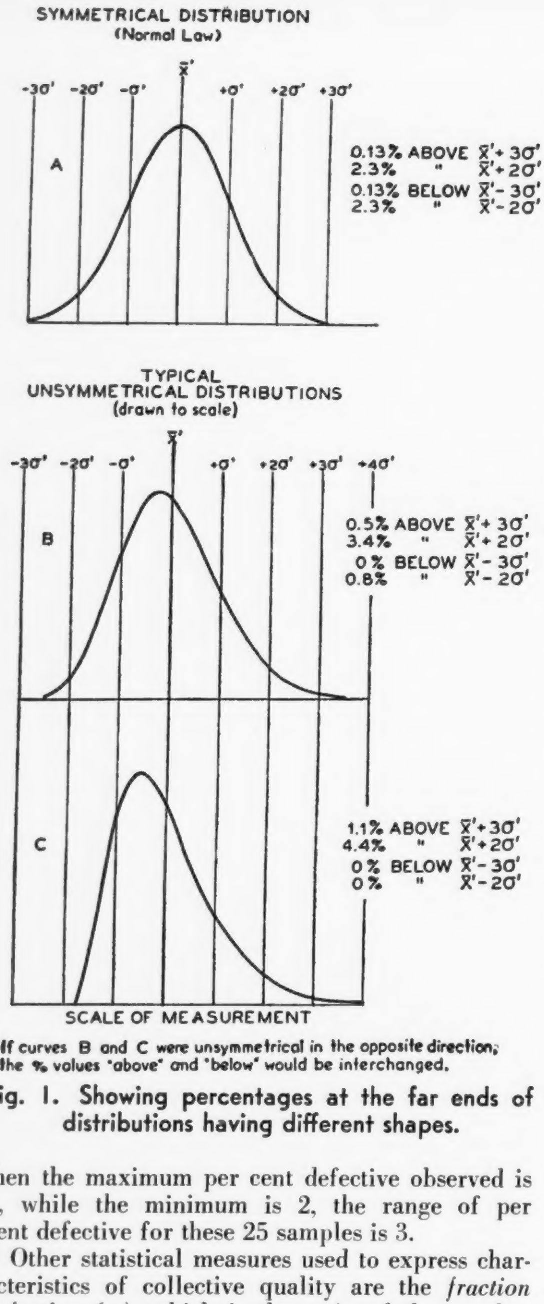
For example, we may take 25 samples of 100 pieces each, all of these being gaged, and determine the per cent defective for each sample. If

This description of the way in which quality of a product can be controlled through use of a Quality Control Chart was published in *American Machinist*, December 10 and December 24, 1942. The manufacturer is interested in control of quality of the products he purchases, and control of quality of the products he makes. The present article was written mainly with a view to the latter aspect.

With the U. S. War Department using the control chart method extensively in the arsenals, and encouraging its use by private industry, this technique is becoming an important factor in our war effort. It is also being used in Great Britain, where the first two American War Standards on quality control have been reprinted, with the permission of the American Standards Association, by the British Standards Institution. In Australia, too, these American War Standards have been adopted.

This article is reprinted here in order that ASA members may give the Quality Control Standards careful consideration with a view to applying this technique to the repetitive processes used by their companies. They may find that the inspection data they have been collecting as a matter of routine for checking the quality of individual units of product are sufficient for the application of the control chart technique. The data can thus be used to better advantage without increased cost of inspection and in some cases, even with a reduction in inspection cost.

Copies of the standards can be obtained from the American Standards Association. The first two, American War Standard, Guide for Quality Control (Z1.1-1941), and American War Standard, Control Chart Method of Analyzing Data (Z1.2-1941), are published in one pamphlet at 75 cents. The third, American War Standard, Control Chart Method of Controlling Quality During Production (Z1.3-1942), published separately, is also available at 75 cents per copy.



If curves B and C were unsymmetrical in the opposite direction, the % values "above" and "below" would be interchanged.

Fig. 1. Showing percentages at the far ends of distributions having different shapes.

then the maximum per cent defective observed is 5, while the minimum is 2, the range of per cent defective for these 25 samples is 3.

Other statistical measures used to express characteristics of collective quality are the *fraction defective (p)*, which is the ratio of the number of defective units to the total number of units under consideration[3]; *the number of defectives (pn)* in a sample of *n* units; and the *number of defects (c)* in a sample of stated size, such as the number of flaws in 100 feet of wire. Which statistical measure or measures should be used must be decided in each individual case.

Inspection by Sampling—When a quality characteristic is measured on each unit of a lot of product, it is a simple matter to express the collective quality of the lot in such measures as the average, the standard deviation and the range, since these values can be computed from the observations made on the units. The problem becomes more complicated when 100 per cent inspection is impracticable and the collective quality of a lot must be determined, with the closest possible approximation, from observations made on samples drawn from that lot. Inspection by sampling may be necessary because the inspection test is destructive (for example, the tensile test made on a specimen of material, or the firing test of ammunition)—, or because 100 per cent inspection, while technically feasible, is uneconomic (for example, where parts come in a large flow from an automatic machine). In such cases we can get a picture of lot quality only from the combined pictures of a number of sample qualities—each of which is in its turn a composite picture of a number of unit qualities.

In sampling inspection, the important question arises:

To what extent does a sample taken from a lot of product present a reliable picture of the quality of the entire lot? The answer depends on a number of factors, such as the sizes of the lot and the sample, and the degree of uniformity of quality in the lot. Since the make-up of a sample and hence, the relation between sample quality and lot quality depends on *chance*, valid conclusions regarding lot quality can be drawn from sample qualities only with the aid of the theory of probability. This fact and, in general, the statistical background of the standards under discussion, need not dismay the technical expert who is not conversant with statistical theory. The practical tool to be used by the man in charge of quality control, which was developed through cooperation between the engineer and the statistician and described in the standards, requires merely the use of simple arithmetic. This tool is the *quality control chart*.

State of Statistical Control—The quality control chart is based on the concept "statistical control" which will be explained briefly here.

The variations in the quality of a product, from unit to unit, or from sample to sample, or again, from lot to lot, are due to numerous causes. From the viewpoint of quality control, these causes may be divided into two classes: (1) causes of variation whose effect is insignificant and which, therefore, merit no investigation, and (2) causes of variation whose effect is significant in that they result in excessive fluctuations in quality and hence, must be eliminated if we are to get control. Causes of variation of the latter type are called *assignable causes*,—which practically means causes of trouble. When the latter are found and eliminated from the production process, and the variation in quality has become insignificant, the production process is said to be in a state of statistical control or, briefly, *in a state of control*. The residual vari-

[3] The use of *per cent defective (100p)* is often preferred.

ation in quality is due solely to the combined effect of unknown causes which by their very nature cannot be weeded out systematically. Possibly, with increasing knowledge, some of these unknown causes may become assignable in the course of time, in which case their elimination will still further reduce the residual variation. However, for a given process, considered at a certain time, the amount of knowledge at our disposal determines the limit to which our finding of assignable causes and their elimination can go.

It will be clear that this approach to the problem of quality control becomes workable in practice only if we have a criterion to determine whether a variation in quality is *significant*.

Normal Distribution—Such a criterion is found by making a comparison between the unknown distribution of quality, in which we are interested in a specific case, and a known theoretical distribution representing a "model" of perfect statistical control—that is, a distribution resulting from a condition where no assignable causes of variation are present. Such a comparison enables us to decide whether the observed distribution appears to deviate from the "model" distribution to such an extent as to indicate lack of control. This procedure is similar to the use of an optical comparator for checking the contour of a workpiece, such as a screw or a gear, against an ideal contour. In the quality control chart technique, we use as the model of perfect control the so-called *normal distribution* which is graphically represented by the normal frequency curve, or Gauss curve, shown in diagram A, Fig. 1. Its abscissae represent here the values of a certain quality characteristic observed on the individual units of a lot and its ordinates, the respective frequencies with which these quality values (observations) occur in the lot. The area included between the curve and the horizontal axis represents the total number of observations. A mathematical property of this frequency curve is that approximately 99.73 per cent of the total observations fall within two limits located from the central line $\overline{X}'$ at equal distances $3\sigma'$, in which σ' is the standard deviation of the observations from the central line. Such limits are called "3-sigma" limits.

The diagrams B and C, Fig. 1, show unsymmetrical distribution curves. For both of these, the percentage of observations that falls outside the 3-sigma limits is larger than in diagram A.

Part II, which describes how to use the Quality Control Chart, will be published in our May issue.

National Canners Association Publishes Data on Food Labels

A new Manual for the guidance of canners in preparing labels which meet the requirements of the Federal Food, Drug, and Cosmetic Act has just been completed by the National Canners Association. The Manual discusses the legal requirements, the voluntary additions which may be added to the mandatory statements on the labels, and gives a summary table of label terms.

A section outlining the definitions and standards for the terms recommended by the Labeling Committee of the Association explains that the standards for these terms are established by cooperation between the NCA Laboratory and canner committees. Wherever existing standards are agreed upon as suitable, they are used. For example, size standards for peas, green and lima beans, etc, as well as some others, coincide with the standards of the Agricultural Marketing Administration.

Examples of labels are shown in full color.

An entire section is devoted to the standards of identity, quality, and fill of container promulgated under the Food, Drug, and Cosmetic Act. These standards, as well as the text of the Act itself, are given in full.

Copies of the *Manual* may be obtained from the National Canners Association, Washington, D. C.

SAE Publication Describes Army-Navy Aeronautical Standards

"Army - Navy Aeronautical standardization would probably receive a great deal more publicity if it didn't exist," declare Colonel D. G. Lingle and Captain G. A. Seitz in their description of how such standardization is carried out, published recently by the Society of Automotive Engineers. The pamphlet, published originally in the *SAE Journal*, November, gives a clear and complete statement of what the Army-Navy Aeronautical Specifications are and what they cover, as well as how the two services work together to prepare standard specifications for the equipment used in Army and Navy aircraft.

In addition to specific examples showing how AN standards, bulletins, and indexes are developed, the pamphlet traces the 15-year development of Army-Navy aeronautical standardization. It explains by text and chart the organization, functions, and operation of the Aeronautical Board, the working committee of the Board, the Army and Navy Specification Units, the ANC Committee on Aircraft Design Criteria, and the Joint Aircraft Committee.

Copies of the "Army-Navy Aeronautical Standardization—The Record So Far" can be obtained from the Society of Automotive Engineers, 29 West 39th Street, New York.

Standard Tests and Specifications In WPB and OPA Orders

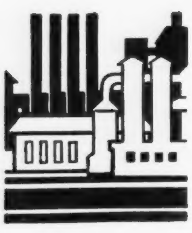
IN many of the War Production Board and Office of Price Administration orders, standards play an important part, either through reference to existing standards or through setting up standards or simplification schedules in the order itself. Such standards form the basis for control of production, conservation of materials, or for control of prices. The following orders have the effect of setting up standard specifications, tests, grades, or simplification schedules.

War Production Board

Busways (General Limitation Order L-273)—

Limits manufacture of plug-in type busways to those having line or phase copper conductors of the sizes specified, and limits the use of steel to specified quantities per linear foot. The specifications give nominal ampere rating, copper circular mill area for conductor, conductor tolerance, and maximum pounds of steel per linear foot for three types of plug-in busways. No device larger than Size No. 3 shall be used, however, without authorization of the War Production Board. The same type of specifications are provided for ten sizes of feeder-type busways. No person may manufacture more than one model or design of plug-in type busway or of feeder type busway in any of the sizes provided, except that two models or designs, but not more, may be produced in Size No. 1 of the plug-in type.

Any feeder type busway manufactured must be designed so that it will carry under continuous duty a full power load equivalent to the nominal ampere rating specified for that size, and without exceeding a temperature rise of 70 C in any part of the conductors under specified conditions. The temperature is to be determined according to the measurements for "hot-spot" temperatures provided in American Institute of Electrical Engineers Standards AIEE No. 1, June 1940.



Cans (Conservation Order M-81 as amended March 12, 1943)—

This order specifies the size of cans used in packing fruits and vegetables as well as other products such as abrasives, benzol, naphtha, blood plasma, chloroform and ether, shoe polish, soap, and dangerous chemicals. The type and weight of material to be used in the can for each type of product is also specified.

Closures for Glass Containers (Amendment 1 to Conservation Order M-104 as amended January 1, 1943)—

The type of material, subject to allocation of rubber, is specified for closures for use on cans for fluid milk, and for home canning.

Coal Tar (Conservation Order M-297)—

Prohibits the use of coal tar as fuel or for any other purpose except for distillation, unless the coal tar has a low-boiling tar acid content of less than ½ of 1 per cent. The order also limits the use of coal tar oil to the extraction of tar acids. Any coal tar oil delivered without processing for the extraction of tar acids shall have a low-boiling tar acid content of less than 1½ per cent. Methods of test for determining the low-boiling tar acid content in both these cases are provided, using ASTM Methods D 20-30 and D 453-41 for coal tar and ASTM Methods D 246-42 and D 453-41 for the coal tar oil.

Cotton Fabric Production (Limitation Order L-99, as amended March 6, 1943)—

Gives a selected list of constructions which may be produced on looms of different types. (See article page 118.)

Industrial and Commercial Refrigeration and Air Conditioning Machinery and Equipment (Limitation Order L-126)

Required Specifications for Refrigeration Valves, Fittings, Accessories, and Other Parts (Schedule IV)—

Provides required specifications, as authorized in Limitation Order No. L-126. Production is limited to the types and sizes of valves, fittings, and accessories specified in this Schedule.

Required Specifications for Commercial Reach-In and Walk-In (Pre-fabricated Sectional) Refrigerators (Schedule V)—

Production is limited to the sizes of refrigerators specified in this Schedule, and the use of metals is restricted to the purposes listed.

Required Specifications for Refrigerant and Service Connections (Schedule VI)—

Outlines required specifications for refrigerant and ser-

vice connections, and limits the use of copper or copper base alloy pipe or tubing.

(For Schedules 1 and 2, Drinking Water Coolers and Condensing Units, see INDUSTRIAL STANDARDIZATION, September, 1942. For Schedule III, Coil or Tube Assemblies for Refrigeration Condensers or Coolers, see October, 1942.)

Material Entering into the Production of Replacement Parts for Passenger Automobiles, Light, Medium, and Heavy Motor Trucks, Truck Trailers, Passenger Carriers, Off-the-Highway Motor Vehicles, and Motorized Fire Equipment (Limitation Order L-158 as amended March 11, 1943)—

Provides that on and after April 1 production of pistons as components of engines, piston pins, piston rings, and engine bearings shall be produced only in standard sizes and a selected list of oversizes.

Men's Work Clothing (Limitation Order L-181 as amended March 27, 1943)—

Gives specifications for a simplified type of work clothing, to conserve material. Limits sizes of overalls to 26 to 50 waist and 27 to 36 inseam. The order applies to waistband overalls or dungarees, bib overalls for carpenters, painters, or paper hangers, and steel workers, overall jumpers or coats, one-piece work suits, and work shirts. Men's work clothing made and sold to conform with state, county, or municipal safety laws, is excluded from the scope of the order.

National Emergency Specifications for Steel Products (Limitation Order L-211)

Carbon Steel Plates (Schedule 8)—

No person shall produce or deliver any carbon steel plate which does not conform to a specification set forth in this order. Specifications are provided for general use for ship hulls, structural, and flange and firebox, nonsilicon and silicon type. Specifications which apply only to government orders are provided for ship hulls, structural, boiler, pressure vessel, and general purpose.

(For Schedules 1, 2, and 3, covering Concrete Reinforcement Steel, Steel Wheels and Tires, and Barbed Wire, Wire Fence, Poultry Netting and Poultry Flooring, see INDUSTRIAL STANDARDIZATION, December, 1942. For Schedules, 4, 5, 6, and 7, Structural Steel Shapes, Steel Axles and Forgings, Mechanical Steel Tubing, and Rails and Track Accessories, see March, 1943.)

Office of Price Administration

Synthetic Textile Products (Maximum Price Regulation 339)

Women's Rayon Hosiery—

Women's rayon hosiery is now to be labeled with the grade, the gauge or needle count, and other information of interest to the buyer. The grade and gauge must appear with the ceiling price and the brand name on the welt. Other information is also to be affixed to the hosiery but may be placed either on the welt or on the foot. This includes the designation "long" or "short" (as defined in the regulation); "out-size" on all out-size hosiery; "extra-long" on all hosiery more than 34-in. long, and the correct size of the foot according to Commercial Standard CS 46-40 "Hosiery Lengths and Sizes." Irregulars, seconds, and thirds are to be so marked.

Grade A and Grade B hosiery must meet specifications as set forth in the regulation. Any hosiery which fails to meet any one or more of the minimum requirements specified is classed as Grade B.

Hardwood Lumber Products (Maximum Price Regulation 338)

Aircraft Veneer—

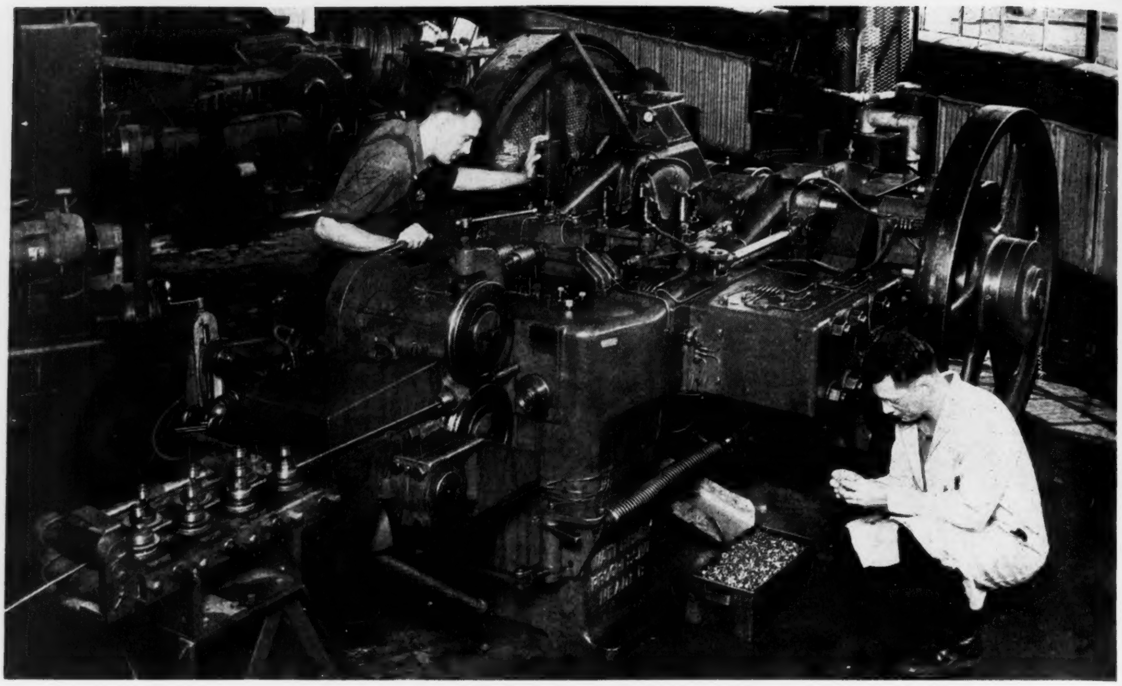
"Aircraft veneer" is defined as rotary cut, half round and sliced yellow poplar, sweet gum, and water tupelo veneer. The material covered by this order is that which meets the Army-Navy specifications (AN-NN-P-511a or AN-NN-P-511b). The regulation gives specifications for the different classes of aircraft veneer for which prices are established.

ASA Announces a Total Of 600 Approved Standards

The American Standards Association now has 600 approved standards available for use by industry, consumer, and governmental groups. This is an all-time high in the 25 years of ASA history.

Twenty-eight of this record list of 600 approved standards are War Standards, developed under the new high-pressure War Standards Procedure set up by the ASA. Under this procedure, at the request of the War Production Board, the Office of Price Administration, the U. S. Army, or the U. S. Navy, the ASA organizes a committee of experts in the field of the standard. This committee prepares the standard and sends it out for criticism, with a time limit, to key individuals in the groups concerned. The chairman of the ASA Standards Council acts for the Association in the approval of emergency projects, appointment of committees, and in the final approval of the War Standards. In this he has the advice of the appropriate correlating committee.

After the war emergency has passed, the War Standards will be reviewed, so that each may be approved, amended, or withdrawn, through the regular procedure of the Association.



Bolt-Heading Machine

Bolts and nuts with British Whitworth threads are being made by the carload as supplies for the United Nations.

Truncated Whitworth Thread Proposed as American War Standard

A NEW ASA War Committee, organized by the American Standards Association to establish an American War Standard for Truncated Whitworth Screw Threads, held its first meeting March 26. The Committee was organized by the ASA at the request of the War Production Board, to remove difficulties experienced in this country in the manufacture and maintenance of taps, dies, and gages for British Standard Whitworth Threads. These difficulties can be met by making certain changes in the British Standard. However, it is essential that interchangeability between American-made and British-made Whitworth Threads be maintained.

Members of the War Committee are:

Professor Earle Buckingham, Massachusetts Institute of Technology, Cambridge, Mass., *Chairman.*

W. L. Barth, General Motors Corporation, Detroit, Mich.

H. W. Bearce, National Bureau of Standards, Washington, D. C.

Elmer J. Bryant, Greenfield Tap and Die Corporation, Greenfield, Mass.

W. H. Gourlie, Gage Sales Department, Pratt and Whitney Division, Niles-Bement-Pond Company, West Hartford, Conn.

A. E. Smith, Senior Ordnance Engineer, Gate Section, Office of the Chief of Ordnance, War Department, Washington, D. C.

The War Production Board, in its request for the new War project, called attention to tables for the nominal dimensions, manufacturing limits, and gage specifications for truncated Whitworth threads worked out in detail by A. E. Smith of the Army Ordnance Department, member of the committee. In a memorandum prepared by Mr. Smith and submitted to the ASA with the WPB request, the following reasons are given for his proposal:

"Considerable difficulty has been experienced in this country in the procurement and maintenance of taps, dies, gages, etc, for British Standard Whitworth Screw Threads frequently used in the production of materiel for the various Allied

armed forces," he explained. "These threads must always interchange with Standard Whitworth threads of British manufacture. A great handicap in the production of these threads in America has been the rounded crest in the profile of screw and nut. These call for a more costly tool set-up and the tools have been harder to procure than for American Standard Thread. Also, maintenance of the proper tool profile is difficult."

Mr. Smith's proposal, offered to overcome these difficulties, consists of a truncated adaptation of British Standard Whitworth Thread and tables of dimensions for the Coarse, Fine, and Special Series. Screw threads with the rounded crests absent, made to these data, are fully interchangeable with Standard Whitworth threads of British manufacture, he declares. This interchangeability has been accomplished by reducing the major diameter of the screw by the amount of the height of the radial crests and by increasing the minor diameter of the nut by a similar amount. The pitch diameter (or "effective diameter" as the British say) is the same as that of the British Standard Whitworth.

Crests of threads on taps and dies for truncated Whitworth may be originated at a suitable height above basic to assure ample wear and this wear may continue until it reaches the basic truncated profile, Mr. Smith explains. Screws may be fabricated from smaller size stock or have their major diameter machined to size. Nuts will obtain their truncated minor diameter by the use of larger drills. Taps and dies and similar tools will be simpler and will be required to do less work. Gages will be simplified and will be less expensive to make.

ASTM Approves New Standards

BY RECENT action of the Standards Committee of the American Society for Testing Materials, several important new standards have been approved in the fields of steel, rubber, and chromium plating.

For some time Committee E-3 on Chemical Analysis of Metals has been developing a standard method for determining selenium in steel. This element is used to improve machinability of certain steels including corrosion-resisting alloys. With no recognized standard available chemists have been handicapped in determining the amounts present not only when the element is specifically added but also as it occurs in stray amounts. A new method, E30-43T, has just been approved, which makes use of the sulfurous acid-iodometric method. Although the standard is published for the first time, it is set up as a tentative revision of the widely used Standard Methods of Chemical Analysis of Steel, Cast Iron, Open-Hearth Iron, and Wrought Iron (E30-42). The new method will be issued in separate pamphlet form.

A new revision of the Tentative Method of Test for Changes in Properties of Rubber and Rubber-Like Materials in Liquids (D471-40T) provides urgently needed standardized procedures for determining volume changes of rubber, particularly the new synthetics on immersion in solvents. The new method is more simple and rapid than the present procedure and gives comparable accuracy. The procedure used is quite accurate, fast, and, the ASTM announces, is a really clever use of glass tubing, selected rubber samples, solvent, and method of measuring.

ASTM Committee B-8 on Electrodeposited Coatings previously had developed a number of important specifications covering various types of coatings on steel, copper, and zinc alloys and a test for local thickness of electrodeposited coatings. Its most recent work has involved agreement on recommended practices for various types of plating. The new Tentative Recommended Practice for Chromium Plating for Steel for Engineering Use (B177-43T) is the first of a number of such standard practices which will be issued. It is presented as an aid to those platers and engineers who, although familiar with ordinary plating practice including decorative chromium plating, are confronted with new problems inherent in the deposition of chromium for engineering use. It is not intended as a standardized procedure but merely as a guide to the realization of smooth, adherent coatings of chromium of desired thickness and to the retention of the required physical properties of the steel base.

The nature of the steel with particular reference to its hardness, procedures for cleaning and etching prior to chromium plating, construction of racks and anodes, the chromium plating operation itself, subsequent treatments of the coating and repair of worn coatings, and finally test methods, are discussed in this document.

This specification is expected to be of real assistance especially to platers and engineers who have only a scanty knowledge of the factors involved in successful "hard" plating.

Copies may be obtained from the American Society for Testing Materials, 260 South Broad Street, Philadelphia, Pa., at 25 cents each. A collection of other plating standards, including standards for zinc and cadmium plating and methods of tests on plated coatings, may also be obtained for 25 cents per copy.

Standards Issued by Associations and Government

(See "ASA Standards Activities", page 138, for new American Standards and progress on ASA projects)

For the information of ASA Members, the American Standards Association gives here a list of the standards received during the past month by the ASA Library for its classified files. With the increasing amount of material being received it has been decided to eliminate from the monthly list a few of those standards which may not be so important to ASA Members, such as Federal Specifications for foods. The list below, therefore, includes only those standards which the American Standards Association believes will be of greatest interest to Members in connection with their war production.

The standards listed may be consulted by ASA Members at the ASA Library, or copies may be obtained from the organization issuing the standard. Addresses of these organizations are given for your convenience.

Associations and Technical Societies

American Society of Heating and Ventilating Engineers (51 Madison Avenue, New York, N. Y.)

Heating, Ventilating, Air Conditioning Guide 21st ed, 1943 $5.00

American Society for Testing Materials (260 South Broad Street, Philadelphia, Pa.)

Book of Standards 1942 ed (see p 133 this issue)
Factory-Made Wrought Carbon-Steel and Carbon-Molybdenum-Steel Welding Fittings A234-42 25¢
Tin-Bronze and Leaded Tin-Bronze Sand Castings, Tentative Specifications B143-42T (also Emergency Alternate Provisions EA-B143) 25¢
Changes in Properties of Rubber and Rubber-Like Materials in Liquids D471-43T
Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials E18-42
Short-Time Elevated-Temperature Tension Tests of Metallic Materials E21-42T

Heating, Piping and Air Conditioning Contractors National Association (1250 Sixth Avenue, New York, N. Y.)

Heat Loss Calculations, Part 1 4th ed, 1943
Net Load Recommendations for Heating Boilers November, 1942

Association of American Railroads—Operations and Maintenance Department—Operating-Transportation Division, Telegraph and Telephone Section (30 Vesey Street, New York, N. Y.)

Emergency Alternate Provisions to Specifications

Specifications for
- Splicing Lead Sheathed Paper Insulated Cables 1-A-12
- Tin-Antimony Wiping Solder 1-A-38
- Long Handle Shovels 1-A-88
- Digging Spoons 1-A-89
- Rosin Core Solder AAR-1-A 2-G-20
- Minimum Wire Sizes of Communication Lines Crossing the Tracks of Railroads, Specification for (revised Table N-1) 1-B-1

National Electrical Manufacturers Association (155 East 44th Street, New York, N. Y.)

Transformers No. 43-84 January, 1943 15¢

Underwriters' Laboratories, Inc. (161 Sixth Avenue, New York, N. Y.)

Grounding and Bonding Equipment 1st ed March, 1943

U. S. Government

Wherever a price is indicated, that publication may be secured from the Superintendent of Documents, Government Printing Office, Washington, D. C. Otherwise copies of the document may be obtained from the governmental agency concerned.)

National Bureau of Standards (Washington, D. C.)

Classification of Acoustic Materials Letter Circular LC-715 (supersedes LC-633)

Commercial Standards

In Print

Douglas Fir Plywood 5th ed CS45-42 (supersedes CS45-40) 10¢
Screw Threads and Tap-Drill Sizes CS24-43 (revision and consolidation of CS24-30 and CS25-30) 10¢

Simplified Practice Recommendations

Alphabetical List Revised to March 1, 1943 Letter Circular LC-718 (supersedes LC-697)

Before Industry for Acceptance

Cast Iron Radiators R174-43

In Print

Adhesive Plaster R85-43 5¢
Dental Hypodermic Needles R108-43 5¢

Federal Specifications Executive Committee (U. S. Treasury Department, Washington, D. C.)

Federal Specifications

(Copies available from Superintendent of Documents, Government Printing Office, Washington, D. C.)

The date after the title of the specification indicates when it becomes effective.

Acoustic-Materials; for plastic-application (Amendment 1) SS-A-111 April 1, 1943

Ammonium-Chloride; (Sal Ammoniac) (Amendment 2) O-A-491 April 1, 1943

Buckets; metal, galvanized (Amendment 1) RR-B-771a April 15, 1943

Instruments, Dental and Surgical; general specifications (new) GG-I-526 April 1, 1943

Insulation; laminated-asbestos (new) HH-I-561 April 15, 1943

Lamps; electric, incandescent, miniature, tungsten-filament (Amendment 1) W-L-111b February 1, 1943

Leather; hydraulic-packing, vegetable-tanned (superseding KK-L-181) KK-L-181a April 15, 1943

Mats; cotton (for concrete-curing) (new) DDD-M-148 April 15, 1943

Plastics, Organic; general specifications (new) L-P-406 March 15, 1943

Pliers and Nippers (new) GGG-P-471 March 15, 1943

Sponges; cellulose-type (new) L-S-626 April 1, 1943

Tile:

structural, clay, load-bearing, wall (superseding SS-T-341, 7/3/34) SS-T-341a April 1, 1943

Tile—(Continued)

structural, clay, non-load-bearing (superseding SS-T-351, 7/3/34) SS-T-351a April 1, 1943

Transformers; distribution, single-phase, 60 cycles (100 Kva and below, 15,000 volts and below) (Amendment 1) W-T-631 April 1, 1943

Emergency Alternate Federal Specifications

Cans, Steel (Tinned-Plate, Terne-Plate, and Black Sheet); friction-covers (superseding E-RR-C-96, 4/30/42) E-RR-C-96a February 10, 1943

Clock-systems; electric E-W-C-471a March 6, 1943

Rope; wire (superseding E-RR-R-571, 12/21/42) E-RR-R-571 January 28, 1943

Tape:

gummed, mending, reinforcing, and securing (superseding E-UU-T-101b, 6/23/42) E-UU-T-101b February 10, 1943

rubber, insulating (superseding E-HH-T-111a, 6/23/42) E-HH-T-111a January 28, 1943

Traps; radiator, thermostatic, brass or bronze, low-pressure, 100-square-foot-size (for land use) E-WW-T-696 March 11, 1943

Varnish; spar, water-resisting (superseding E-TT-V-121a, 8/28/42) February 10, 1943

U. S. Navy Department—U. S. Maritime Commission

Safety and Industrial Health in Contract Shipyards 1943

ASTM Issues Compilations of Standards

Compilations of ASTM standards and material closely related to the use of standards have been issued by the American Society for Testing Materials during the past few weeks. These books, each of which includes all of the standards issued by the ASTM in the particular field covered, are:

ASTM Standards on Mineral Aggregates, sponsored by Committee C-9 on Concrete and Concrete Aggregates and by Committee D-4 on Road and Paving Materials $1.35

ASTM Specifications for Steel Piping Materials (Pipe, Tubes, Castings, Forgings, Boltings) prepared by Committee A-1 on Steel $1.75

Tables of Data on Chemical Composition, Physical and Mechanical Properties of Wrought Corrosion-Resisting and Heat-Resisting Chromium and Chromium-Nickel Steels sponsored by ASTM Committee A-10 on Iron-Chromium, Iron-Chromium-Nickel, and Related Alloys $1.25

ASTM Standards and Data on Electrical Heating and Resistance Alloys, developed by Committee B-4 on Electrical Heating, Electrical Resistance, and Electric Furnace Alloys $1.50

ASTM Standards on Soaps and Other Detergents, developed by Committee D-12. Includes proposed methods of analysis of industrial metal cleaning compositions, and bibliography on aluminum cleaning $1.35

ASTM Standards on Electrical Insulating Materials, prepared under the sponsorship of ASTM Committee D-9. Includes specifications and tests on insulating varnishes, paints, and lacquers; molded insulating materials; plates, tubes, and rods; mineral oils; and ceramic products $2.50

ASTM Standards on Paint, Varnish, Lacquer, and Related Products, prepared by Committee D-1 $1.75

ASTM Standards on Cement. Includes Emergency Alternate Specifications for Portland Cement, and a Manual of Cement Testing $1.35

Copies of each publication at the prices indicated may be ordered from the American Society for Testing Materials, 260 South Broad Street, Philadelphia, Pa.

Bendix Corporation Becomes ASA Group Member

The Bendix Aviation Corporation has made available to its subsidiary companies the services of the American Standards Association. Eight companies will have the benefit of the Group Membership of the Bendix Corporation in the ASA:

Bendix Products Division, South Bend, Indiana
Julien P. Friez and Sons, Baltimore, Maryland
Bendix Radio, Towson, Maryland
Scintilla Magneto Division, Sidney, New York
Bendix Radio, Red Bank, New Jersey
Pioneer Instrument Division, Bendix, New Jersey
Eclipse Aviation Division, Bendix, New Jersey
Bendix Marine Division, Brooklyn, New York

Services available to Group Members of the American Standards Association include free copies of newly approved standards, 20 per cent discount on additional purchases of standards, copies of the monthly magazine INDUSTRIAL STANDARDIZATION, use of the library and information service.

New Foreign Standards Now in ASA Library

THE following new and revised standards, just received by the American Standards Association, may be borrowed by ASA Members, or ordered through the ASA Library.

Great Britain

Revised British Standards

Glossary of Terms Used in Electrical Engineering, Section 1—General Terms (superseding part of BS205-1936) BS205 Pt. 1-1943
Identification of Pipes, Conduits, Ducts and Cables in Buildings (superseding BS617-1935) BS617-1942
Motion Picture Films (superseding 677-1936) BS677-1942
Round Strand Galvanized Steel Wire Ropes for Shipping Purposes (superseding BS365-1929) BS365-1942
Rubber Joint Rings for Gas Mains BS772-1942
Rubber Joint Rings for Water Mains and Sewers BS674-1942

New British Standards

British Standards Institution Handbook 1942 ed
Code of Practice for the Maintenance of Electrical Switchgear BS1086-1942
Fixed Capacitors BS1082-1942
Gas Lighters Cold Catalyst Type for Igniting Town's Gas BS/BOT 20-1942
Haemoglobinometers Haldane Type BS1079-1942
Hearth Furniture BS/BOT 16-1942
Temperature Measurement BS1041-1943
Studio Spotlight Lamps BS1075-1943
Pressed Steel Galvanized Rainwater Gutters, Pipes and Fittings BS1091-1943
Universal Decimal Classification, Part 1 (General Introduction, Auxiliary Tables, Class O Generalities) BS1000-Vol 1
Mastic Asphalt for Flooring BS1076-1942
Welded Joints in Copper Vessels BS1077-1942
Sampling and Analysis of High Purity Zinc and Zinc Alloys for Die Casting BS1005-1942
Test Code for Kilns for Heavy Clay Ware Including Refractory Materials BS1081-1942
Workhead Spindles for Internal and Universal Grinding Machines Including Plain Grinding Machines with Live Spindles BS1089-1942
Short Time Testing of Light Alloys at Elevated Temperatures BS1094-1942
Services Specification for Steel for Hardened and Tempered Coil Spring (for Guns and Armored Fighting Vehicles, etc.) BS/STA 2-1942
Appendix A to Specification BS/STA 2, governing the manufacture of Hardened and Tempered Coil Springs for Guns and Armored Fighting Vehicles, etc.
Shrink Resistance of Certain Woolen Garments BS/BOT 30-1942

Amendments to British Standards

Drain Fittings PD54 (amendment to BS539-1937)
Stirrup Pumps PD56 (amendment to BS/ARP33)
Testing Incombustible Material to Provide a Minimum Standard of Protection against Incendiary Bombs PD75 (amendment to BS/ARP47)
Protective Toecap for Industrial Boots PD49 (amendment to BS953-1941)
Industrial Overalls PD50 (amendment to BS/BOT4-1942)
Notched Bar Test Pieces PF52 (amendment to BS131-1933)

Amendments—(Continued)

Ferrous Pipes and Piping Installations for and in Connection with Land Boilers PD44 (amendment to BS806-1942)
One-Mark Capillary Pipettes PD45 (amendment to BS797-1938)
Miners' Lamp Bulbs PD46 (amendment to BS535-1938)

Revised War Emergency Standards

Wrought Steels (En Series) (superseding BS970-1941) BS970-1942
Ebonite for Electrical Purposes (superseding BS234-1933) BS234-1942
Tars for Road Purposes (superseding BS76-1930 and BS 76 Part 2-1931) BS76-1943
Rubber Conveyor and Elevator Belting (superseding BS490-1933) BS490-1943

New War Emergency Standards

Adhesive Insulating Tape for Electrical Purposes BS1078-1942
Aluminum Alloy Bars for the Manufacture of Fuses and Fuse Parts BS1080-1942
Black Paint (Tar Base) for Use on Iron and Steel BS1070-1942
Bolts, Nuts and Set-Screws (Machine Bolts) BSW and BSF (superseding BS191-1924 and BS193-1929) BS1083-1942
Alternators and DC Generators Internal-Combustion-Engine Driven BS1084-1942
Lead Alloy Pipes BS1085-1943
Pitch Mastic Horizontal and Vertical Damp-Proof Courses, alternative to Mastic Asphalt for Damp-Proof Courses, excluding Tanking BS1092-1943
Insulated Cleat Wire BS1096-1943

Amendments to War Emergency Standards

Rubber Gloves for Electrical Purposes PD38 (amendment to BS697-1940)
Concrete Road Slabs PD40 (amendment to BS1020-1942)
Metal Windows and Doors PD41 (amendment to BS990-1941)
Gears for Clockwork Mechanisms PD51 (amendment to BS978-1941)
Brazing Solder PD55 (amendment to BS263-1931)
Copper Commutator Bars PD59 (amendment to BS445-1932)
Medium-Hard Copper Strip, Bars and Rods PD60 (amendment to BS518-1933)
Copper for the Winding of Electrical Machines PD61 (amendment to BS444-1932)
Titanium White for Paints (incorporated in BS239-1935) PD65 (amendment to BS636-1935)
Wrought Steels PD69 (amendment to BS970-1942)
Insulating Oils PD74 (amendment to BS148-1933)
Soft Solders PD76 (memorandum No. 3 to BS219-1942)

New Zealand

Simplified Practice for Manufacture

Corsetry E/99
Handkerchiefs E/97
Women's and Girls' Underwear E/101

Emergency Specifications

Hearing Aid Equipment E/83
White Traffic Paint E/102

OWI Announces Savings Through Simplification and Standards

Weston

Simplification and standardization of panel-type instruments has aided production of radio and electronic equipment for the armed forces.

BY eliminating unnecessary sizes and styles in scores of articles from hairpins to industrial power trucks, the War Production Board in 1942 saved 600,000 tons of steel, 17,000 tons of copper, large quantities of other materials, and enough man-hours to build 23 Liberty ships, according to estimates made public March 7 by the Office of War Information.

The reduction in the use of materials and man-hours were accomplished through approximately 100 Limitation Orders affecting 315 products.

In addition to economies in the use of steel and copper, 82 simplification orders are estimated to have saved 180,000,000 yards of cloth, 30,000 tons of leather, 450,000,000 feet of lumber, 227,000 tons of pulp, 35,000 tons of solder and 8,000 pounds of tungsten. The simplification orders have not only saved materials, but they also have increased production, the OWI announced.

The Limitation Orders have standardized many products as well as setting up simplification schedules, the OWI pointed out. Simplification eliminates certain types and sizes of a product whereas standardization defines the characteristics of the product which is to be produced. It is in the production of weapons which are subject to the hazards of battle that standardization is most important, the OWI declared. When standard components are made for tanks, guns, and airplanes, weapons needing spare parts can be re-equipped more easily.

The work of standardization is carried forward in cooperation with professional engineering societies, the Armed Services, and the manufacturers. Where the Army and Navy use the same weapons, they have agreed in many instances to standardize their components. The contract by which the American Standards Association carries forward war standards projects at the request of the War Production Board and the Office of Price Administration is one of the methods by which this cooperation is carried out.

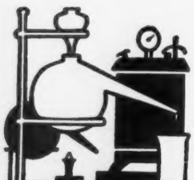
Limitation orders have reduced sizes or types of certain valves and fittings from 4,030 to 2,500, electric light bulbs from 3,500 to 1,700, heavy forged hand tools from 1,150 to 357, mechanical water coolers from 27 to 8, manual and special purpose wood saws from 800 to 210, industrial power trucks from 221 to 50, X-ray equipment from 100 to 25, auto tire chains from 14 to 3, and portable jaw and roll crushers from 25 to 5, the OWI announced.

Paper Industry Proposes Simplification Program

A simplification program to conserve paper supplies was recommended to the War Production Board March 18 by representatives of the commercial printing industry. The recommendations, drafted by a committee of the United Typothetae of America, called for a reduction of about 66 per cent in the number of weights, grades, and sizes of paper stock. The committee estimated that such a program would result in a saving of from 8 to 10 per cent in the consumption of paper by printers.

Thomas B. Sheridan of Baltimore, Md. who presented the recommendations to E. W. Palmer, deputy director of the printing and publishing branch of the War Production Board, said the committee had found "no logical economic reason" for many of the paper sizes, grades, and weights now in use by printers.

Committee on Petroleum Products Acts on Standards



AT MEETINGS of Committee D-2 on Petroleum Products and Lubricants of the American Society for Testing Materials in Cleveland, March 9 and 10, a number of actions were taken which will eventually affect the various standards and proposed standards under the committee supervision. Many of the actions affecting standards must be confirmed by letter ballot, however, before formal recommendation is made at the ASTM annual meeting in June.

ASTM Committee D-2 and the ASA Committee on Petroleum Products and Lubricants (Z11) maintain a close cooperative relationship, and much of the work of the ASTM committee is transmitted to the ASA for approval through Committee Z11. The ASA committee looks to the ASTM committee for much of the technical work on standards it considers. In turn, the ASA committee makes recommendations to the ASTM committee on standardization problems which need consideration. Some of the recommendations of ASTM Committee D-2 reported in this article may be referred to ASA Committee Z11 for consideration and submittal to the ASA.

The newly organized Subcommittee XXIV on Petroleum Sulfonates recommended that the present Tentative Methods for the Carbonizable Substances in White Mineral Oil (D565) and Carbanizable Substances in Paraffin Wax (D612) be adopted as standards since the methods have been found to be entirely satisfactory.

The committee plans to recommend that the test for oxidation characteristics be issued by ASTM as an emergency test. In this test the lubricant is evaluated only with respect to stability or resistance to oxidation, bearing corrosion, and the deposition of intrinsic contaminants resulting from decomposition, oxidation, or other changes that occur in the lubricant in service. Considerable interest was shown at the meeting in one of the appendices of this test covering insoluble matter in used crankcase oils.

Recently there has been considerable activity involving tests for neutralization and saponification number. The method of Test for Neutralization Number of Petroleum Products by Color-Indicator Titration (D663-42T), and Method of Test for Neutralization Number of Petroleum Products by Electrometric Titration (D664-42T) were issued last year and Method of Test for Saponification Number of Petroleum Products by Color-Indicator Titration (D94-42T) was also published. Subcommittee XIII on Neutralization Number and Saponification reported that it has developed an additional saponification number test making use of the electrometric method which will be recommended for publication and information and to solicit comments.

The results of the cooperative work to correlate the results of the ASTM bomb test with actual storage stability of gasoline were presented at the meeting for information.

The Technical Committee on Turbine Oils voted to publish as information the progress to date with regard to formulation of a method for the determination of the oxidation characteristics of turbine oils.

WPB Prohibits Steel Valves of 400 Psi Series

By request of the Valve Manufacturers' Association the following note is being inserted into each copy of the American War Standard, Pressure-Temperature Ratings for Steel Pipe Flanges, Flanged Fittings, and Valves (B16e5-1943):

NOTE

The attention of those using the American War Standard B16e5-1943 is called to the WPB Limitation Order L-252 dated January 23, 1943. This Limitation Order prohibits the manufacture, sale, or purchase of valves of the 400 psi series, beginning May 1, 1943, with certain stated exceptions.

Fire Protection Group Nominates Small on ASA Board

With regret, INDUSTRIAL STANDARDIZATION calls attention to an error in the article on page 75 of the March issue, "Four New Members on ASA Board of Directors." In listing the new members, it was announced that Alvah Small, president, Underwriters' Laboratories, Inc., Chicago, Illinois, was nominated by the National Safety Council. This is, of course, an error. Mr. Small was nominated by the Fire Protection Group of the American Standards Association, which is made up of the Associated Factory Mutual Fire Insurance Companies, the National Board of Fire Underwriters, the National Fire Protection Association, and the Underwriters' Laboratories, Inc.

Argentina Cracks Down On Cheese Standards

"AWARE at last that only standardized products of very high quality can compete effectively on the very competitive United States market, Argentina, on February 24, will take a precedent-setting step which is bound to have tremendous repercussions throughout Latin America," declares *Business Week*, February 6.

The precedent-setting step is that cheese shipped from Argentina after February 24 must pass rigid new standards of quality, age, shape, weight, color, packing, and storage.

In 1940 and 1941 Argentina became the source for a great share of the supplies of cheese which before the war had been sold to the United States by Italy and Switzerland. In 1942, however, the amount of cheese supplied to the United States by Argentina fell off, partly due to tighter United States import regulations, partly to the shortage of shipping space. It was also due, however, explains *Business Week*, to the refusal of unorganized Argentine producers to formulate and adhere to rigid standards of packaging and shipping. From an all-time high of 26,385,000 lb in 1941, business fell to barely 16,500,000 lb of cheese shipped from the Argentine to the United States.

Under present conditions, the Government of Argentina is forced to buy many farm products normally sold for export. It is using this situation to force producers to standardize and improve the quality of their goods.

The cheese trade is one of the first to work out a formula for action. When a cheese committee composed of members of the Argentine-American Chamber of Commerce in New York was formed to assist in supervising cheese imports and to help in the settlement of claims, the Argentine Ministry of Agriculture sent two of its best experts to study the needs of the United States cheese market and to inspect shipments arriving at United States ports.

Inspection of cheese for export has already been tightened, it is reported. Also in the offing is the possibility of a still stricter control to be enforced by the Argentine government to familiarize the country's cheese producers with the requirements of the American market.

"Ultimate aim of far-sighted officials in Buenos Aires is a complete modernizing of the whole industry—from the cow to the finished product," declares *Business Week*.

Committee Postpones Work On Wire Sizes

The Subcommittee on Wire and Sheet Metal Gages of ASA Committee B32 on the same subject has decided to postpone final action on the proposed American Standard for Preferred Sizes for Bare and Metallic-Coated Round Wire until after the close of the war.

In December, 1942, the subcommittee held a meeting to receive the report of its subgroup which had developed the proposed standard. Copies of the proposal had been sent out to industry for criticism and comment in February, 1942, and the canvass had resulted in a number of disapprovals, the subgroup reported. The large majority of these adverse comments had come from the manufacturers and users of copper wire.

After reviewing the report, the subcommittee accepted the statement made in these letters that a very large amount of unification had been accomplished in this branch of industry on the basis of the American Wire Gage (Brown and Sharpe Gage) which is based on a factor of 1.123 or about 12 per cent.

The fact that approximately one-fourth of the replies indicated disapproval or counseled delay prompted the subcommittee to decide to postpone final action on this proposal as an American Standard until the close of the present world war. However, its members expressed the hope that the manufacturers and users of steel and nonferrous wire would give careful consideration during this period to the gradual adoption of the preferred diameters proposed by the subcommittee. The 50 preferred sizes proposed by the subcommittee, expressed in thousandths of an inch are:

Preferred Sizes for Round Wire

	0.344	0.180	0.090	0.045	0.022	0.011	0.0056		
	0.312	0.160	0.080	0.040	0.020	0.010	0.0050	0.0025	0.0012
	0.281	0.140	0.071	0.036	0.018	0.009	0.0045		
0.500	0.250	0.125	0.063	0.032	0.016	0.008	0.0040	0.0020	0.0010
0.438	0.224	0.112	0.056	0.028	0.014	0.007			
0.375	0.200	0.100	0.050	0.025	0.012	0.0063	0.0032	0.0016	0.0008

These diameters are given in inches.

ASA Standards Activities

Standards Available Since Our March Issue

Castings
- Alloy-Steel Castings for Structural Purposes (ASTM A148-42) American Standard G52.1-1943 25¢
- Carbon-Steel Castings for Miscellaneous Industrial Uses (ASTM A27-42) American Standard G50.1-1943 25¢
- Carbon-Steel Castings Suitable for Fusion Welding for Miscellaneous Industrial Uses (ASTM A215-41) American Standard G51.1-1943 25¢

Engineering and Scientific Graphs for Publication American Standard Z15.3-1943 75¢

Measurement of Test Voltage in Dielectric Tests American Standard C68.1-1942 40¢

Rotating Electrical Machinery on Railway Locomotives and Rail Cars and Trolley, Gasoline-Electric and Oil-Electric Coaches American Standard C35.1-1943 50¢

Standards Approved Since Our March Issue

Rotating Electrical Machinery American Standard C50-1943

Standards Being Considered by ASA for Approval

Cast-Iron Pipe Flanges and Flanged Fittings, Class 250 (Revision of B16b-1928)

Cold-Rolled Strip Steel (ASTM A109-38) G47

Colored Textiles, Fastness L14

Keyways for Holes in Gears B6.4

Lime
- Limestone, Quicklime, and Hydrated Lime, Methods of Chemical Analysis of (ASTM C25-29)
- Quicklime for Structural Purposes, Specifications for (ASTM C5-26)

Threaded Cast-Iron Pipe for Drainage, Vent, and Waste Services

Zinc Coating of Iron and Steel
- Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses (ASTM A120-42)
- Zinc-Coated Steel Wire Strand ("Galvanized" and Class A ["Extra Galvanized"]) (ASTM A122-41)

Standards Submitted for Consideration Since Our March Issue

Basic Sulfate White Lead, Tentative Specifications for (ASTM D82-42T) Revision of American Standard K7-1941

Chrome Yellow and Chrome Orange, Tentative Specifications for (ASTM D211-42T) Revision of American Standard K27-1941

Copper-Base Alloy Forging Rods, Bars, and Shapes, Tentative Specifications for (ASTM B124) Revision of American Tentative Standard H7-1939

Electrical Insulating Materials C59
- Methods of Testing:
  - Sheet and Plate Materials Used in Electrical Insulation (ASTM D229-42) C59.13
  - Laminated Tubes Used in Electrical Insulation (ASTM D348-42) C59.14
  - Laminated Round Rods Used in Electrical Insulation (ASTM D349-42) C59.15
  - Molded Materials Used for Electrical Insulation (ASTM D48-42T) C59.1
  - Impact Resistance of Plastics and Electrical Insulating Materials (ASTM D256-41T) C59.11

Photography Z38
- Dimensions of Photographic Papers—Inch Width Rolls Z38.1.F
- Dimensions of Photographic Papers—Centimeter Size Sheets and Rolls Z38.1.G
- Dimensions of Amateur Roll Film and Backing Paper Z38.1.L1 to Z38.1.L9 (9 standards)
- Dimensions of Amateur Roll Film Spools Z38.1.Q1 to Z38.1.Q9 (9 standards)
- Method of Determining Photographic Speed and Speed Number Z38.2.1
- Definition of Safety Photographic Film Z38.3.A
- Lens Aperture Markings Z38.4.7
- Picture Sizes for Roll Film Cameras Z38.4.8
- Lantern Slide Projectors (exclusive of Microfilm Readers) Z38.7.3
- Testing Printing and Projection Equipment Z38.7.5
- Opaque Projectors for Written or Printed Matter and Pictures Z38.7.4

American War Standards

Standards Approved and Published

Accuracy of Engine Lathes B5.16-1941 25¢

Allowable Concentration of Cadmium Z37.5-1941 20¢

Allowable Concentration of Manganese Z37.6-1942 20¢

Code for Electricity Meters (Revision of Paragraph 827) C12WS-1942 10¢

Color, Specification and Description of Z44-1942 25¢

Components for Military Radio
- Ceramic Radio Insulating Materials, Class L C75.1-1943 20¢
- Electrical Indicating Instruments ($2\frac{1}{2}$ and $3\frac{1}{2}$ Inch, Round, Flush-Mounting, Panel-Type) C39.2-1943 50¢
- Fixed Mica-Dielectric Capacitors C75.3-1942 50¢

Domestic Gas Ranges, Approval Requirements Z21.1ES-1942 $1.00

Gas Water Heaters, Approval Requirements Z21.10WS-1942 $1.00

Machine Tool Electrical Standards C74-1942 40¢

Photographic Exposure Computer Z38.2-1942 $1.00

Pressure-Temperature Ratings for Steel Pipe Flanges, Flanged Fittings and Valves (Revision of Tables 6 to 11 inclusive, American Standard B16e-1939) B16e5-1943 25¢

Protective Lighting for Industrial Properties A85-1942 50¢

Protective Occupational Footwear
- Men's Safety-Toe Shoes Z41.1-1943
- Men's Conductive Shoes Z41.3-1943
- Men's Explosives-Operations (Non-sparking) Shoes Z41.4-1943
- Men's Electrical-Hazards Shoe Z41.5-1943
- Men's Foundry (Molders) Shoes Z41.6-1943

  } In one Volume 40¢
- Women's Safety-Toe (Oxford) Shoes Z41.2-1943 25¢

Quality Control
- Guide for Quality Control Z1.1-1941
- Control Chart Method of Analyzing Data Z1.2-1941

  } In one Volume 75¢
- Control Chart Method of Controlling Quality During Production Z1.3-1942 75¢

Standards Published—(Continued)

Replacement Parts for Civilian Radio
  Dry Electrolytic Capacitors (Home Receiver Replacement Type) C16.7-1943 20¢
  Home Radio Replacement Parts, Simplified List C16.8-1943 20¢
  Fixed Paper-Dielectric Capacitors (Home Receiver Replacement Type) C16.6-1943 20¢
Straight Screw Threads for High-Temperature Bolting B1.4-1942 25¢

Standard Approved and Published Since Our March Issue

Replacement Parts for Civilian Radio
  Power and Audio Transformers and Reactors (Home Receiver Replacement Type) C16.9-1943 25¢

Standards Under Way

Allowable Concentration of Z37
  Metallic Arsenic and Arsenic Trioxide
  Xylene
Class 125 Cast-Iron Flanged Fittings B16a
Color Code for Lubricants for Machinery Z47
Goggles and Respiratory Equipment, Standardization and Simplification of Z2
Packages for Electronic Tubes Z45
Pressure Ratings for Cast-Iron Pipe Flanges and Flanged Fittings, Class 125 B16a1
Replacement Parts for Civilian Radio C16
  Volume Controls (Home Receiver Replacement Type)
Screw Threads B1
  Acme Screw Threads for Aircraft
  Threading of General Purpose Nuts and Bolts
  Truncated Whitworth Screw Threads

Standards Under Way—(Continued)

Sizes of Children's Garments and Patterns L11
Welding Arc Hand Shields and Helmets Z2
Women's Industrial Clothes and Safety Clothes L17
Components for Military Radio
  Capacitors
    Fixed Ceramic-Dielectric Capacitors
    Fixed Molded Paper-Dielectric Capacitors C75/221*
    Paper-Dielectric Capacitors
  Crystals
    Crystals and Holders
  Dynamotors
  Instruments
    Shock-Testing Mechanism for Electrical Indicating Instruments
  Insulating Materials
    Ceramic Radio Dielectric Materials, Class H
    Glass-Bonded Mica Radio Insulators C75/211*
    Glass Radio Insulators
    Porcelain Radio Insulators
    Steatite Radio Insulators
    Molded Plastic Derivatives
    Thermosetting Molded Plastics
  Resistors
    Composition Potentiometers and Rheostats
    Fixed Resistors, Rated Dissipation Below 2 Watts
    Fixed Instrument-Type Resistors (Bobbin or Spool Styles)
    Fixed Instrument-Type Resistors (Cylindrical, End-Ferrule Styles)
    Fixed Wire-Wound Resistors, 2 Watts Above
    Wire-Wound Potentiometers and Rheostats

New Project Approved

Cylindrical Fits B4

* Printed draft is available.

News About ASA Standards Projects

Building Code Requirements and Good Practice Recommendations for Masonry, A41

A third draft of a proposed standard incorporating approved amendments and suggested changes has been circulated to the committee with a proposal that the draft standard be submitted to the ASA for approval.

Building Code Requirements for Fire Protection and Fire Resistance, A51

A second meeting of this committee will be held on April 8 to consider comments received on the memorandum outlining what the proposed standard might cover. Five subcommittees have been set up on various phases of the committee's work.

Building Code Requirements for Chimneys and Heating Appliances, A52

The organization meeting of this committee will be held on April 29 to consider a memorandum outlining what the proposed standard might cover.

Building Code Requirements for Light and Ventilation, A53

A third draft is being circulated to the committee.

Building Code Requirements for Iron and Steel, A57

Proposed American Standard Building Code Requirements for Structural Steel (Riveted, Bolted, or Welded Construction) have been approved by the committee and are now before the sponsors for approval.

Proposed American Standard Building Code Requirements for Steel Joist Construction have been approved by the sectional committee.

Protective Occupational Footwear, Z41

Four of the six recently approved standards are under revision. They are:
  Women's Safety-Toe (Oxford) Shoes Z41.2-1943

Footwear—(Continued)
  Men's Conductive Shoes Z41.3-1943
  Men's Electrical-Hazards Shoes Z41.5-1943
  Men's Foundry (Molders) Shoes Z41.6-1943

Spring Washers, B27

A proposed American Standard for Spring Washers in sizes from No. 2 (minimum inside diameter 0.088 in.) to 1½ in. (minimum inside diameter 1.525 in.) has been sent out to a canvass of industry. The proposal covers dimensions for medium light and heavy spring washers intended for automotive and general industrial application. Comments and suggestions received from industry as a result of this canvass will be considered by Subcommittee 2 on Spring Washers of ASA Committee B27 on Plain and Lock Washers, which subcommittee prepared the proposed standard. Chairman of the subcommittee is E. D. Cowlin, Eaton Manufacturing Company. W. L. Barth, Standards Engineer, General Motors Corporation, is chairman of ASA Committee B27.

SAE Issues New Standards for Automotive Lighting Equipment

A new table of recommended practice for lamps for military vehicles, as well as revised SAE test procedures for automotive lighting equipment, were approved recently by the SAE General Standards Committee and the SAE Council.